

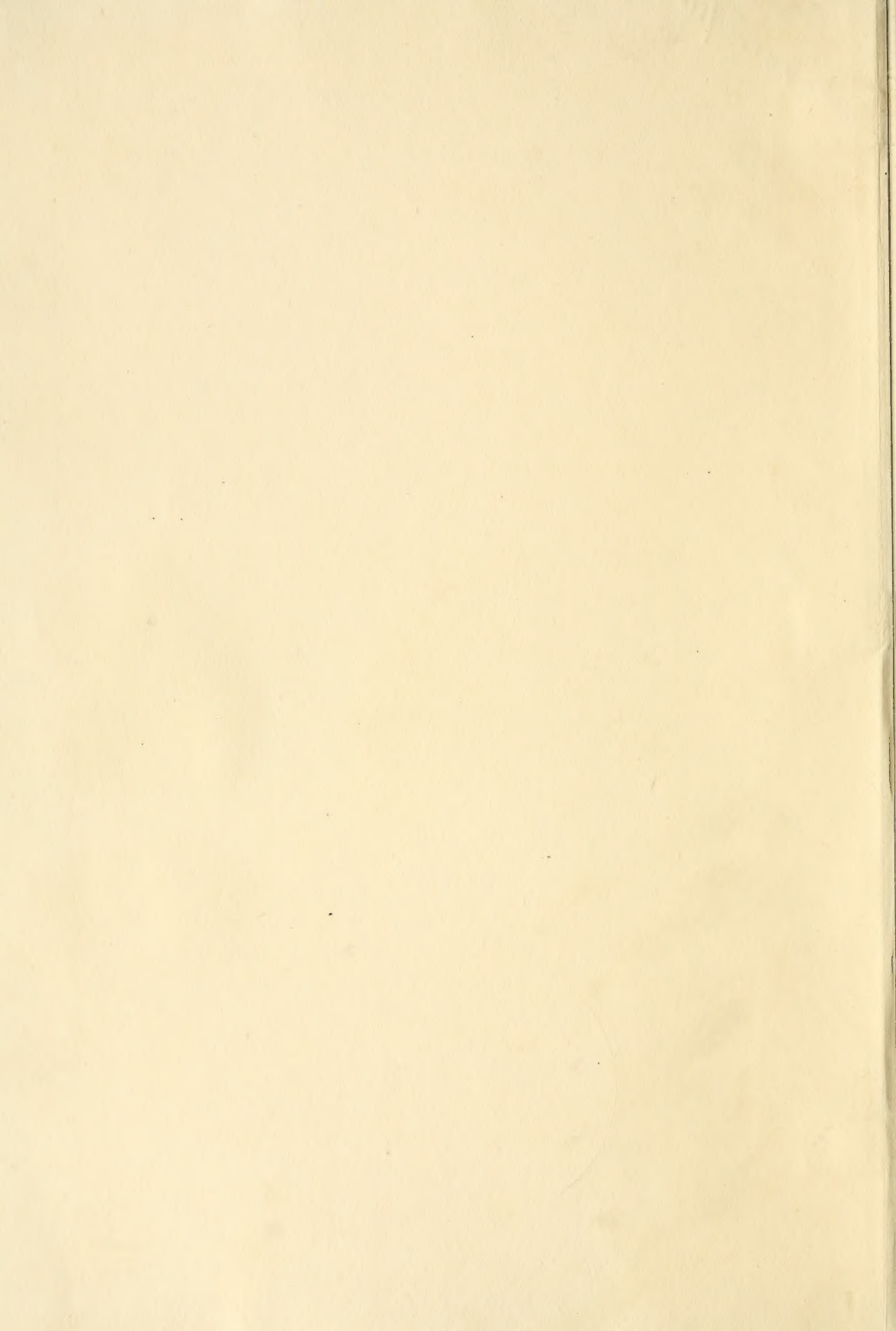
Seventh Annual Report

COMMISSION OF CONSERVATION

CANADA

1916

and - Nov. 8/16



Commission of Conservation

*Constituted under "The Conservation Act," 8-9 Edward VII, Chap. 27, 1909, and
amending Acts, 9-10 Edward VII, Chap. 42, 1910, and 3-4 George V,
Cap. 12, 1913.*

Chairman :

SIR CLIFFORD SIFTON, K.C.M.G.

Members :

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DR. GEORGE BRYCE, University of Manitoba, Winnipeg, Man.
DR. WILLIAM J. RUTHERFORD, Member of Faculty, University of Saskatchewan,
Saskatoon, Sask.
DR. HENRY M. TORY, President, University of Alberta, Edmonton, Alta.
MR. JOHN HENDRY, Vancouver, B.C.

Members ex-officio :

HON. MARTIN BURRELL, Minister of Agriculture, Ottawa
HON. WILLIAM J. ROCHE, Minister of the Interior, Ottawa
HON. P. E. BLONDIN, Minister of Mines, Ottawa
HON. JOHN A. MATHIESON, K.C., Premier, President and Attorney-General,
Prince Edward Island
HON. ORLANDO T. DANIELS, Attorney-General, Nova Scotia
HON. GEORGE J. CLARKE, Premier and Minister of Lands and Mines, New
Brunswick
HON. JULES ALLARD, Minister of Lands and Forests, Quebec
HON. G. H. FERGUSON, Minister of Lands, Forests and Mines, Ontario
HON. A. B. HUDSON, Attorney-General, Manitoba
HON. GEORGE W. BROWN, Regina, Saskatchewan
HON. ARTHUR L. SIFTON, Premier, Minister of Railways and Telephones,
Alberta
HON. WILLIAM R. ROSS, Minister of Lands, British Columbia

Assistant to Chairman, Deputy Head :

MR. JAMES WHITE

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Canada
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Commission of Conservation

Canada

SIR CLIFFORD SIFTON, K.C.M.G., Chairman
JAMES WHITE, Assistant to Chairman, Deputy Head

REPORT
OF
THE SEVENTH
ANNUAL MEETING

HELD AT OTTAWA

JANUARY 18-19

1916



Committees of the Commission of Conservation, 1916

Committee on Fisheries, Game and Fur-Bearing Animals*

Dr. C. C. Jones, Chairman; Hon. A. E. Arsenault, Hon. George J. Clarke, Hon. O. T. Daniels, Hon. G. H. Ferguson, Hon. A. B. Hudson, Hon. J. A. Mathieson, Dr. Howard Murray, Dr. J. W. Robertson, Hon. W. R. Ross.

Committee on Forests

Senator W. C. Edwards, Chairman; Dr. Frank D. Adams, Dr. B. E. Fernow, Mr. John Hendry, Hon. William J. Roche, Mr. W. B. Snowball, and the ex-officio Members of the Commission who represent the various Provinces.

Committee on Lands

Dr. J. W. Robertson, Chairman; Dr. F. D. Adams, Dr. George Bryce, Hon. Martin Burrell, Mgr. C. P. Choquette, Mr. E. Gohier, Dr. C. C. Jones, Dr. W. J. Rutherford, Dr. H. M. Tory, and the ex-officio Members of the Commission who represent the various Provinces.

Committee on Minerals

Dr. Frank D. Adams, Chairman; Mgr. C. P. Choquette, Hon. P. E. Blondin, Mr. John Hendry, Mr. J. F. MacKay, Dr. Howard Murray, and the ex-officio Members of the Commission who represent the various Provinces.

Committee on Press and Co-operating Organizations

Mr. J. F. MacKay, Chairman; Hon. Jules Allard, Dr. George Bryce, Dr. Howard Murray, Dr. H. M. Tory.

Committee on Public Health

Sir Edmund B. Osler, Chairman; Hon. H. S. Béland, Hon. Martin Burrell, Hon. J. A. Calder, Mgr. Choquette, Dr. C. C. Jones, Dr. W. J. Rutherford.

Committee on Waters and Water-Powers

Hon. H. S. Béland, Chairman; Dr. F. D. Adams, Hon. Jules Allard, Hon. George J. Clarke, Hon. G. H. Ferguson, Dr. B. E. Fernow, Hon. W. R. Ross, Mr. C. A. McCool, Acting Chairman.

TO FIELD MARSHAL, HIS ROYAL HIGHNESS PRINCE ARTHUR WILLIAM
PATRICK ALBERT, DUKE OF CONNAUGHT AND OF STRATHEARN,
K.G., K.T., K.P., &c., &c., GOVERNOR GENERAL OF CANADA

MAY IT PLEASE YOUR ROYAL HIGHNESS :

The undersigned has the honour to lay before Your Royal
Highness the Seventh Annual Report of the Commission of
Conservation for the fiscal year ending March 31st, 1916.

Respectfully submitted

CLIFFORD SIFTON

Chairman

OTTAWA, April 3, 1916

OTTAWA, April 2, 1916

SIR :

I have the honour to transmit herewith the Seventh Annual Report of the Commission of Conservation. This contains a report of the proceedings of the Seventh Annual Meeting, held in Ottawa on January 18-19, 1916, in which is included summary statements of the work done under the several committees of the Commission, during the fiscal year ending March 31, 1916.

I have the honour to be, Sir

Your obedient servant

JAMES WHITE

Assistant to Chairman

SIR CLIFFORD SIFTON, K.C.M.G.

Chairman

Commission of Conservation

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Courtesy of Hydro-Electric Power Commission of Ontario

PROVINCIAL POWER DEVELOPMENT AT EUGENIA FALL; HEAD, 550 FEET,
HIGHEST DEVELOPED IN ONTARIO

PROCEEDINGS
OF THE
SEVENTH ANNUAL MEETING
OF THE
COMMISSION OF CONSERVATION

HELD AT
OTTAWA, JANUARY 18 and 19, 1916

THE Seventh Annual Meeting of the Commission of Conservation was held at the offices of the Commission, Ottawa, on Tuesday and Wednesday, January 18 and 19, 1916. In the absence of Sir Clifford Sifton, K.C.M.G., Chairman of the Commission, Hon. Senator W. C. Edwards occupied the chair. The other Commissioners present were:

Dr. Frank D. Adams, Montreal, Quebec
Hon. Aubin E. Arsenault, Summerside, P.E.I.
Hon. G. W. Brown, Regina, Saskatchewan
Dr. George Bryce, Winnipeg, Manitoba
Mgr. Choquette, St. Hyacinthe, Quebec
Hon. Orlando T. Daniels, Halifax, Nova Scotia
Dr. Bernhard E. Fernow, Toronto, Ontario
Dr. C. C. Jones, Fredericton, New Brunswick
Mr. J. F. MacKay, Toronto, Ontario
Hon. John A. Mathieson, Charlottetown, P.E.I.
Mr. Charles A. McCool, Pembroke, Ontario
Dr. Howard Murray, Halifax, Nova Scotia
Dr. J. W. Robertson, C.M.G., Ottawa, Ontario
Mr. William B. Snowball, Chatham, New Brunswick

The morning session opened at ten o'clock. The minutes of the last annual meeting were read and approved. Letters and telegrams of regret at inability to be present were read from the Chairman, Sir Clifford Sifton, K.C.M.G., Hon. Jules Allard, Hon. W. J. Bowser, Hon. P. E. Blondin, Hon. George J. Clarke, Hon. G. H. Ferguson, Mr. Albert Grigg, Mr. Charles Finlay, E. A. Dunlop, M.P.P., Mr. John Hendry, Dr. William T. Hornaday, Hon. A. B. Hudson, Mr. D. McDonald, Sir Edmund B. Osler, M.P., Hon. W. J. Roche, Hon. W. R. Ross, Dr. W. J. Rutherford, Hon. A. L. Sifton, Dr. Henry M. Tory.

Address of Chairman

LADIES and Gentlemen: In the absence of our Chairman, Sir Clifford Sifton, who, unfortunately, has been called away to the bedside of his wounded son, I have been asked to preside at this meeting. I am sorry he did not select someone more capable of performing that duty, but, as he has asked me, I will do the best I can. Were Sir Clifford here himself I am sure he would give you a résumé of the work of the Commission, one befitting the extent of its activities, and one which would be highly interesting to you.

I regret I am not in a position to give you such a summary, as I am not intimately conversant with all the immediate interests of the Commission. I know of certain things that have come under my own observation, however, which, to my mind, fully justify its existence. For instance, in the conservation of our timber, alone, this Commission has done a very great deal. As an illustration, right at home, near to the Ottawa valley, I have no doubt at all in my own mind that the two associations for the preservation of the forests, the St. Maurice Forest Protective Association and the Lower Ottawa Forest Protective Association, are both the result of the efforts of the Commission.

The legislation which has been brought about in connection with the preservation of forest resources along the lines of railways may also be claimed as directly due to the activities of this Commission. On the Intercolonial railway in former days practically nothing was done. Now, a great advance has been made in getting the co-operation of the Intercolonial railway in that same regard. These things alone, if no others, certainly justify the existence of this Commission.

But there are several other things with which I am not so familiar. There is the question of town-planning, in which, I believe, quite an advance has been made, and, if the education that accrues therefrom has no other result than to bring about the construction of buildings and the laying out of cities and towns in such a way as to prevent their destruction by fire, that alone will be a very great thing. Again, in reference to the fisheries, a great deal has been done.

One of the most recent and perhaps most important results of the Commission's activities was the discovery of phosphate of lime in the Rocky mountains, near Banff. Everyone who is familiar with agriculture knows that the time must come when artificial enrichment of the land will be required in our great Northwest,

therefore, nothing can be more important than the fact that there is a large bed of phosphate available. That phosphate discovery has been made through the efforts of this Commission. We know that phosphoric acid and potash are the two great requisites in sustaining vegetation, because, so far as nitrogen is concerned, we can always obtain that in another way, through the growing of leguminous plants; but the potash and phosphoric acid must be obtained from some extraneous source, and, consequently, I know of nothing more important for the agricultural interests of the western provinces than this discovery of phosphate.

I know it will be far more interesting for you, however, to listen to the addresses and papers which will be read by the several gentlemen who are here than to listen to me expatiating upon the work of the Commission.

Before calling for the first paper, I would ask Dr. Robertson to propose a resolution on behalf of the Commission, as to the death of the late Sir Sandford Fleming, one of the members of this Commission.

RESOLUTION ON DEATH OF SIR SANDFORD FLEMING

DR. J. W. ROBERTSON : Mr. Chairman, ladies and gentlemen: I am sure I voice the feelings of every member of the Commission when I express our great sorrow at Sir Sandford Fleming being taken away from us. But we have this satisfaction, that he left behind him a record of uncommon value in the public service which he gave to Canada. In his personality he was one of the most lovable men whom one might ever count among his friends, and during all the years he was in Canada he set an unimpaired example to the young man, the middle aged man and the old man, of our nation to live up to the highest aspirations and traditions of our race. I am sure every member will join with me in agreeing to have put on our records an expression of our appreciation of his work, of our sincere regret at our loss, and of our sympathy to those he left behind. I therefore beg to move:

"That this meeting of the Commission of Conservation, desires to express its sincere sympathy with the family of the late Sir Sandford Fleming, whose death occurred on the 22nd of July, 1915."

The resolution was adopted.

Fire Protection and Fire Prevention

BY

FRANKLIN H. WENTWORTH

*Secretary of the National Fire Protection Association
Boston, Mass.*

THE National Fire Protection Association, although born in the United States some twenty years ago, is now international in its operations, a large portion of our membership being in Canada. Both the United States Government and this distinguished Commission are represented on our Board of Directors, the Deputy Head of the Commission, Mr. White, being one of our correspondents, and Dr. Stratton, of the United States Bureau of Standards, another; so we have been working for the last half dozen years directly with the United States Government, and also in co-operation with the work of this Commission in its fire prevention work.

Annual
Fire Loss

I had thought to utilize certain statistics upon fire waste, but I assume that most of the gentlemen of the Commission are familiar with them. Besides there is on the table in the ante-room a pamphlet, "Fire Waste Facts and Figures,"* which gives very clearly an account of the Canadian fire waste and the expenses of fighting fires. For example, it shows that the annual average fire loss in Canada for the past three years has been \$23,000,000. Then it adds the cost of insurance protection in excess of the losses paid, and the cost of maintaining water-works and private fire protection, aggregating a total annual cost of over \$49,000,000. Those are colossal figures, and, when you add to them the cost of fire waste in the United States, it makes a grand aggregate of \$218,000,000 a year in the United States and Canada.

Property that has been burned is gone forever; it cannot be replaced, except by an equal, or, perhaps, by a greater, output of human energy. This great waste is not only impoverishing the citizens of the United States and making their struggle for a livelihood harder, but the operation of this tax is equally hard upon Canadians. The fire waste of the more prudent countries of Europe is also set down in this pamphlet. There is a striking difference in the number of fire alarms, the loss per capita and the number of

*See Appendix III.

fire alarms per 10,000 of population. In Edmonton, the number of fire alarms was 550 in 1915 and in Tokio the number was 521, and yet the average number of alarms per 10,000 of population was 76 in Edmonton, while in Tokio the average was 2.

What is the Cause?

The above shows us clearly the character of our people. What is the excuse for it? What is there in our industrial, our commercial, our social life—because the life in Canada and in the United States is practically the same—what is it that leads us, willingly, to sustain this tremendous strain without any organized protest? We in the United States think that with us it is largely psychological. We have had boundless natural resources. So has Canada. Any people, or individuals, born to affluence and to luxury, will spend easily; and we Americans, and you Canadians, have felt that our supply of natural resources was inexhaustible. It is only within the last seven years that the United States Government has taken any interest in conserving those properties and those resources which remain to us collectively as a people; and the existence of your Commission indicates that the same thought is now dominant with you—that some consideration must be given to the coming generation—and our heritage which we must preserve and conserve for those to follow after.

Early Destruction of Timber

The feeling that our supply of lumber is inexhaustible is, I think, largely responsible for the American attitude towards the fire waste. When the settlers first came to North America, along the Atlantic coast, they had to cut down and burn beautiful standing pines, to get at the soil to cultivate it. That bred in them, and has continued in us, a feeling that our supply of timber was inexhaustible, and it was easier for us in this new country, to build and burn and build again than to adopt those methods of building so long recognized in the old world.

I wish, for a few moments, to deal with the economic consequences of this fire loss, and then, out of our experience, indicate certain things which the Commission may do, certain plans which may be laid and followed and which will not be prohibitive in expense, in getting this big work started. This item is of special importance because the people do not realize the insidiousness of the fire tax. You gentlemen can conserve the fisheries, you can conserve the forests, you can definitely go after certain natural opportunities and wealth and preserve them for the people by process of law, without great co-operation on the part of the people themselves. But such is the character of the fire waste that you cannot do that, you can practically do nothing without the co-operation of the people, and

the feeling of the people in the United States—and I fancy the consciousness is not very different in Canada—is that the fire waste does not affect them. They do not appreciate how the burning of created resources touches their pocket books. For this reason you have before you the enormous problem of educating the man in the street.

Fire Tax
Concealed in
Price of Goods

The merchant, the manufacturer, the men who handle large stocks of goods, realize that their goods are insured, and they add the cost of the insurance to the goods and pass it on to the people; and whoever buys a hat, or a pair of shoes, or a suit of clothes, or anything that goes through the channels of production, distribution and exchange, pays that fire tax, but it is concealed in the cost of the goods. It is indirect taxation. Now, you will agree, it is some undertaking to educate the people of this country to that fact, because they will have to see, first, the economic sequence—to see it clearly by the most elementary sort of examples. Take cotton, as an illustration. Cotton is insured in the sheds in the south, it is insured while on the railway platform, insured while in transportation, insured in the textile factory, insured in the warehouse, insured in the local dry goods store—all the way along, from the cotton field that cotton bears an accumulative fire tax, and when we buy cotton goods we pay it—included in the cost of the goods. It is the same with wool, from the back of the sheep to the clothes we wear, that tax is added.

Insurance
Companies only
Collectors

The difficulty is to make the people who do not know understand that there is a fire waste. They will read most placidly fire reports without any reaction of intelligence. We see men in business life, who will read a fire report of \$200,000 loss, and then look only to see if the property was insured. If it was insured, they will dismiss the matter from their minds as something not concerning them, as something that the insurance companies must bear. But how could the insurance companies pay \$218,000,000 a year and remain solvent? They are merely the collectors and distributors of this tax, plus the expense of carrying on their business, which is considerable. That is the great problem you must meet and you must get your people to understand. In the United States we have been at it for twenty years, and as yet have made very little progress, because of the difficulty of reaching the people. You can reach some of the people through manufacturers' associations, Canadian Clubs and other organizations that have the welfare of the Dominion at heart; but with the ordinary man, who is unorganized, and whose habits with fire are so reckless—the most reckless in the world—it is difficult to accomplish anything.

Carelessness
with
Matches

We put ashes into wooden receptacles and clutter up furnace rooms with all sorts of rubbish. Fires continually occur from carelessness with matches—we find them everywhere, even in the linings and pockets of old coats. In Europe, however, if you want a match, you have to go where it is kept, in its proper receptacle. See the man in an American hotel lobby, how careless he is. He lights his pipe or his cigar, and probably from some sub-conscious feeling that he should be careful, he casually shakes the match a little and then throws it away; it may be out or it may not. Then, too, our people seem to have lost the faculty, if they ever had it, of being impressed by an ordinary fire. A \$100,000 fire in Europe shocks Europe. It at once precipitates inquiries as to who was responsible and whether the thing could possibly be duplicated. A \$100,000 fire in Europe shocks Europe; but, if we pick up a morning paper and do not find two or three such fires we think it has been a dull evening! We are not impressed by any fire that has a mere commercial consequence or property loss, and we need something like the Asch building disaster (Triangle Waist Co.) or the Diamond candy factory fire, where many lives were lost, to impress us at all. But this continual daily blaze and consequent impoverishment of our people, to the extent of \$218,000,000 a year, is the problem we have to meet, and to meet as quickly as we can. We, in the United States, pay for your fires, you in Canada pay for ours. In this tremendous economic matter, insurance companies cannot confine themselves to any particular locality; no city or province can cut itself off from the comity of other cities and provinces. It is an international proposition, and the insurance companies that do business in the United States mostly do business in Canada as well. We are all one people, in the matter of stopping this tremendous drain, because the collectors and distributors of the tax are international. So it is our common problem. As I said, the people are blinded by the notion that the insurance companies pay this colossal tax. If the insurance companies received their revenues from Mars, or Jupiter or some remote planet, we could afford to be indifferent; but it is obvious that they have no way of getting money except by assessment of all losses right back on us. Whenever a man has a fire unnecessarily, it is an unneighbourly act, because he picks our pockets and lays us all under assessment for what he may be pleased to call his misfortune. Undoubtedly, in the United States, we have taken up this matter of fire prevention much too late; we ought to have taken it up when the Pilgrim Fathers landed at Plymouth! But we are making up for lost time—we are educating people in the public schools, we are sending literature

broadcast, and are now getting the rather tardy support of American newspapers. The editors did not realize there was any such problem until about ten years ago.

**Gradual Change
in Public
Opinion**

Gradually we are getting public education under way, but the impatience of the American business interests with this tremendous drain under present conditions has become so great that they are apparently willing to adopt the European method, namely, of holding a man as a public offender who has a fire, unless he can prove that he was not responsible for it. In France, if a man has a fire and it goes outside his premises and damages his neighbour's property, he has to pay his neighbour's loss. That is very educative! In Germany, if you have a fire, the first person who calls to offer condolence is the policeman. He locks you up, and you have to go before a court and prove that you were in no wise responsible, either by neglect or purpose, or you have to pay the cost of the fire and pay the city for the cost of extinguishing it as well. It is that penalty which is appealing to the imagination of the business man in the United States to-day—to assess the cost of fighting the fire on the man who has a preventable fire, especially if he disobeys any fire prevention or fire department order.

**Responsibility
for Disobeying
Order**

Already, in New York, such a case has been decided, and, as it is very typical and interesting, I wish to tell you of it. The Greenwood Cemetery Company has a large building in New York. That building was in very hazardous condition, and the fire department issued an order for its protection by automatic sprinklers. The company ignored the order and a fire occurred. Fire Commissioner Adamson then brought suit under a clause in the Greater New York city charter, which had never been invoked, although it had been there for fifty years. The clause said that if a man disobeys an order given by the fire department he shall be responsible in the event of fire for the cost of extinguishing, or attempting to extinguish, any fire that may result. The Inferior Court in which the case was tried, being imbued with the idea that every man having a fire is an unfortunate, and that, if he does not soak anyone but the insurance company, nobody cares (not knowing that we pay it ourselves!) ruled that the Fire Commissioner had no case. The Fire Commissioner appealed to the Superior Court, which reversed the judgment of the Inferior Court, and awarded \$1,500 damages against the company. It was a bad fire, and some of the firemen were severely injured. An order was issued against another establishment and they ignored the order and had a fire. They settled for \$1,000 without going to court.

Personal Responsibility for Cost of Fire The State of Pennsylvania has passed a law, and it is now in effect, that, in cities of the second class, a man who disobeys a fire department order shall be responsible for the cost of extinguishing any fire which may result. The city of Cleveland has done the same thing by city ordinance. So it is already recognized in the laws of some states, that a man who disobeys an order, and has a fire, must bear the cost of extinguishing that fire, or attempting to extinguish it, and any injuries that may occur to firemen. Such an enactment seems rather drastic to some of us, who have grown up in the idea that we can burn our own property and that our neighbours, without any responsibility, merely offering our condolences or expressing our regrets!

SUGGESTIONS TO MEET CANADIAN CONDITIONS

I think that, perhaps, before the Canadian people are successfully educated in this matter, you gentlemen may also come to this conclusion that it is perfectly just and proper, if a man has been told by the proper official to clean up his basement, which may be filled with boxes, excelsior, and other inflammable material, and he ignores the order and has a fire, he should be made to pay the municipality the cost of extinguishing that fire. It is possible, however, that in undertaking this work, you may avoid certain aspects of the problem with which we are confronted in the United States, and I wish, as briefly as possible, to indicate what, in my mind, and from our experience, you may do in Canada, and do quickly, as your country is not yet as populous as ours.

Provincial Fire Marshals There are two main factors, things you can do by education and things you can do by legislation. In the first place, I think Canada should have a fire marshal in each province, who shall be a statistician and an educator and also a prosecutor of arson. He should have these three functions. You now have fire marshals in several provinces. Ontario in 1914 passed a Fire Marshal Act, and a fire marshal has recently been appointed. That is a good beginning. Each province should have such an official. Then you should have a standard minimum building code for Canada. There are acres of wretched construction in the United States. We have hundreds and hundreds of homes that, although the buildings are of wood, might easily have been made reasonably fire safe. These buildings are erected with the partitions open, without any fire stops, so that the first you know of a fire that starts in the basement is when it breaks out through the roof. The house is a mere shell, and, with a draught in the parti-

tions, the fire may pass quickly from basement to roof. The well-constructed frame building to-day is fire-stopped at each floor, so that fire can more easily be confined to the basement. I have no doubt that Canada is full of such wretched construction, because it has been the policy in America to build of wood, without any regard to the conservation of wood. I shall not go into the subject of forest fires. These statistics I have quoted are in reference to the destruction of created resources only, and do not refer to forest fires, which latter constitute another great drain and waste in both countries.

Standard Building Code A standard building code should not be so detailed as to embarrass local architects and builders; but certain specific minimum requirements may be laid down, under which no building shall be erected which does not meet those simple, rudimentary rules of safety. In Massachusetts we have a proposed State building code, by which any city can choose its own class, A, B, C and D, commencing with minimum requirements, and can step up into more severe requirements as the city becomes more settled. It is an automatic application of a state building code which, to me, is exceedingly interesting, because it has not been tried anywhere else in the country that I know of.

Defects in Construction The main thing in fire prevention, however, is to have certain glaring defects in building construction, such as unprotected floor openings, prohibited. The first investigations of our association, in New England, revealed many glaring defects of this character. The examination of factories was undertaken by a little group of engineers, and they discovered that in practically all buildings the stairways were open, the elevators were open, and belt holes were cut through the floors, so that there were no draught stops. They found lateral floor areas so great that the fire department could have no chance of stopping a fire before it assumed wide proportions. The architects have been rather serious offenders against fire safety. The architect is originally an artist. He sees beautiful facades and creations, but the idea of making buildings fire-safe has not yet occurred to him, so he plans big open light wells from the basement to the roof. We must fire-stop our openings, both laterally and vertically, to repress the spread of fire.

Standardize Fire Protection Then there should be a standardization of municipal fire protection. I do not suppose you will find in Canada two municipal fire departments alike. The organization will differ, the application of the laws will differ, the equipment will differ in every city. It is so in the United States.

We are now attempting to standardize our fire protection and group our cities in fire defense so that the insurance companies may have some idea of the proper basic rate.

FIRE PREVENTION BRANCH OF COMMISSION SUGGESTED

I believe there should be an engineer, in the employ of the Commission, whose specific duty should be to consider the fire waste problem and how to solve it. Do you know that there is not, in Canada, to-day, anyone from whom a person interested in fire protection or fire waste can get information on the subject except the insurance companies? There is no fire protection engineering staff in the country to whom a municipality or an individual property holder can appeal. In Canada, as in the United States, this matter has been left entirely to the insurance companies as, presumably, the only agency or financial interest concerned with fire waste.

Independent Information Required The people must take up this thing themselves and I could not make a better suggestion than that this Commission should have in Ottawa a department with a capable fire protection engineer, whom the cities may consult, independent of insurance companies, and from whom they may secure accurate information. The office should also be the source of a persistent and continuous educational campaign. I think it is very essential that there should be such a source in the office of the Commission, to take up this matter and persistently follow it. That will give the Dominion a rallying point.

Local Prevention Commissions As a complement to this, I believe that, in every city, and every town for that matter, you can get co-operation through the appointment of a local commission. Any board of trade or any commercial club throughout the Dominion, in any of the cities, might easily appoint a fire protection committee. Nearly all our boards of trade in the United States have such committees working locally. But the Commission could definitely start such local committees by going into the towns and picking out in each a capable architect, a capable builder, a capable business man—a group of half a dozen leading men of the town, and appointing them a local fire prevention commission. The fire chief should be the executive officer, because the fire chief is the one most interested in checking fires. He is thinking about it all the time, and if he can call in this group of leading citizens to consult with him, and help him do the things that need to be done for the safety of the city, you will have in every city a little group responsible right to your office, men who will appreciate the dignity of appoint-

ment at your hands, and will be willing to study the matter and work out improvements locally in their own cities. They can help to administer the details of the building code after you get it established; they can inaugurate regular inspection by the fire department, so that the housekeeping of the towns may be improved; they may do innumerable things to improve the character of the cities in respect to fire waste. Those are the two suggestions with which I wish to conclude: A fire protection engineer, under the direction of the Commission, and fire prevention commissions in all cities and towns, reporting directly to you and co-operating in your work.

THE CHAIRMAN (Senator Edwards): I personally have had the pleasure of hearing Mr. Wentworth on two or three occasions previously, and his addresses have always been both interesting and instructive, and I am sure that you must all have listened to this address with great pleasure and advantage. I was very much interested in his description of how the individual pays for the fire protection on the cotton from the beginning to the end. The suggestion with regard to the appointment of an engineer to this Commission, as a central point for information, is, I think, a very important matter, and one well worth consideration. Of course, there is a limit to the extent which this Commission can spend money; they can spend only what they get. I think that is one improvement, however, which we should make a great effort to carry out. I heartily concur in what Mr. Wentworth has said. This paper, as in the case of all papers or addresses delivered before this Commission, is now open for discussion. Does any lady or gentlemen present wish to ask any questions or make any remarks?

MR. WENTWORTH: I wish merely to emphasize the fact that I realize the finances of the Commission are perhaps not as great as we might wish; and, for that reason, I think the plan of local commissions, entailing no expense whatever, would be admirable for the conduct of this matter.

DR. F. D. ADAMS: I think nothing strikes one who travels in Europe more than the fact that fires so seldom occur. Mr. Wentworth speaks of the state of affairs in France and Germany. I remember that, during the two years I lived in Heidelberg, no fires of any kind occurred in that city of 30,000 inhabitants, nor had there been one for some time before, or after. In fact, the only time we ever saw the fire brigade was when it paraded once a year, on Sunday—I presume, to show it was still in existence. Undoubtedly the one great thing necessary here, and in the United States, is the

education of the public in reference to this matter. Only two or three weeks ago I was asked to speak on the preservation of our resources, at a Forum gathering of workingmen and others, in the poorer parts of Montreal. I spoke more particularly on the conservation of our buildings, etc., from fire, because that was a phase of conservation which, perhaps, appealed more directly to them. It was very interesting to note the attitude of some of the speakers. One man said he considered that fires were not an unmixed evil, because they gave work to the workingmen in building up the houses again. I suggested, in order to give his view full and complete effect, and to bring about the result he wished to obtain to the greatest extent, we might make a rule to burn down the cities once a year. As everyone laughed, he was quite indignant, and said I had exaggerated what he had said and made him appear ridiculous. That general idea has a certain prevalence among our people. A lady made a very rational suggestion. She said she had lived in France and one reason for the rarity of fires there was that people were more careful with matches, because the heavy tax on them gave them a distinct value. Possibly the adoption in Canada of a similar system of taxation would not be altogether ineffectual.

SENATOR EDWARDS: As a result of an address by Mr. Wentworth, delivered in Ottawa, before the Canadian Club, in November, 1913, a Fire Prevention Association was formed in this city. That association has already done a lot of good. "Clean-up day," in May, is one of the results of its formation, as also the examination of premises, basements, etc., for bad fire conditions. There is no question but that the Association has done a great deal of good.

Fire Protection from the Private Timber Owners' Viewpoint

BY

ELLWOOD WILSON

Forester, Laurentide Company, Limited

IMAGINE a manufacturer, with his whole stock of raw material for his lifetime, piled up in one store-house. Would he not insure it? Would he not instal automatic sprinklers? Would he not have watchmen on the premises? Let me carry the parallel a little further, and ask what you would do, if you knew that the destruction of your stock of raw material meant the destruction of the elements from which it could be reproduced, as also the supply for your children and your children's children.

The forest is such a store-house, and on it depend some of our most important industries, the stability and continuity of our water-powers, the welfare of our agricultural population, and the comfort of our daily lives. The private timberland owner is just as vitally interested in fire protection for his woodlands as is any manufacturer. He might far better let his saw-mill, his sulphite plant, or his paper-mill go uninsured, and spend the money in protecting his forests. In a year or two he can rebuild his mill; he can easily borrow the money for the purpose, and go on just as before. But he cannot reproduce his forests.

Bad Fires	After a bad fire the soil itself is partially or wholly
Destroy the Soil	destroyed, and, if the fire has been of any extent,
	the nearest source of seed may be too far distant

to permit natural reforestation. I have seen a tract of land, of about ten square miles in extent, which, after fifty-six years, has not a stick of merchantable timber on it, although covered with a growth of small birch and aspen, already past its prime. Not only is there no merchantable timber but, on this whole tract, there are but 1,280 spruce and balsam trees 3" or less in diameter. Of burnt-over land in Quebec 16 per cent, or about 10,597 square miles, is not reproducing, and that on which reproduction has begun is 12·9 per cent. These figures are based on actual surveys over a large area, and, when applied to the areas under license, are rather under than over the amounts.

**Slash Disposal
Is Important**

One of the most important questions to be considered by lumbermen for the protection of their forests is an efficient and economical method of slash disposal. Toplogging on operations where large amounts of timber are cut has proved, in my experiments, to be too expensive for the measure of protection it gives, and I think the only solution will be in brush-piling and burning. The cost of this will be very little more than for simple lopping, as the brush has to be piled in any case, and the protection will be absolute. In my experience, the great majority of fires originate in slashings, and such fires cause most damage and are the hardest to fight. If all operators are required to dispose of their slash, it will be no hardship, as it will put all on the same basis and the cost will be added to the finished product.

Would a farmer set fire to his wheat crop? Would he burn his seed wheat for years to come? Would he let his employees smoke if it endangered his crop? Would he allow hunters, fishermen and campers to freely travel over his land, making fires and scattering lighted tobacco from their pipes? Would he let his neighbour light bonfires where the fire would spread to his standing grain? He would not. Is he wiser, more practical, more hard-headed than the lumberman? Is he a keener business man? You will say no. But there are dozens of men, whose bread and butter depend on their supply of raw material from the forest, who do just such things and worse. I could multiply instances enough to make a volume.

**Fire Protection
is Plain Business**

Fire protection is not forestry, any more than it is logging or milling, but, it is the foundation, the absolute essential, of all these. Without it they cannot exist. If we are not prepared to protect our forests, then, as practical men, let us cut them down and use them up before they are burnt. Fire protection is not a matter of cost; it must be done as cheaply as possible, but it must be done at any cost.

Remember, in Canada we are not dealing with privately-owned forests, but with government-owned forests; they are the property of the people; every man, woman and child has a direct interest in them, which extends to generations yet unborn. It is the duty of our public servants to see that they are protected, and that the licensees, who are but tenants, should not be allowed to shirk their responsibilities. Quebec is the only province in eastern Canada to fully realize this, and its fine of \$5.00 per square mile for the licensee who fails to properly protect his limits has done much good.

The average man does not realize how closely fire protection touches him. Every stock-holder of timber-owning companies should take an interest in fire-protection, and see that his directors are taking care of their forests. Bond-holders are vitally interested, as a good part of their security may be wiped out in one large fire. Banks should not loan money on timber limits as collateral, until they have investigated the fire prevention provided by the borrower. Do not depend upon any concern which does its own fire protection, unless it is done by a department which has no other duties. The timberlands departments have too many other duties, they have men they want to "take care of" from one season to the next, from the end of the drive to the beginning of the fall cut. They leave their patrol to cache-keepers, dam-keepers, and, if there is any exploring, any repairing or other odd jobs, fire rangers are taken off to do them. Then, too, it runs up the logging cost, and you all know what a terrible thing that is. Fire protection is a business by itself. It requires special knowledge, special training, and special tools and methods; the man who is skilled in logging or driving is not necessarily a good fire discoverer or fighter, in fact, rather the reverse.

Railway Fire Protection

The same thing applies to railway fire-fighting, which is usually left to section crews. These men have other work to do and many of them do not take any interest in fire protection work. It would pay the railways, and be far more efficient, to have special fire patrolmen under a separate department head. The reduction of damage claims would pay for the expense many times over. Just as volunteer fire-fighting is out of date, so is amateur forest fire protection. A maintenance-of-way department begrudges every cent spent on fire protection, and this attitude filters down to the section men.

All our work for the conservation of our timber resources is wasted if we cannot conquer the fires. When I first went into the woods in Quebec, I was told one day that there were fires all along a river. "Why don't you put them out or prevent them?" I asked. "Oh, you can't help having fires; it is impossible to put them out. We'll get rain pretty soon." But this attitude has changed and the outlook is very hopeful.

Co-operative Protection

The first real attempt at fire protection in Quebec was made in 1908, and now, after only eight years, we have 38.5 per cent of the licensed area of the province under co-operative protection, and this protection is becoming more and more efficient each year. Co-operative fire protection is not only more efficient, but it is much cheaper than individual protection. It is costing the larger members of



LOGGING SLASH IN EASTERN CANADA

No attempt made at brush disposal; this condition constitutes a very serious fire hazard



RAPIDS IN GRAND DISCHARGE ,SAGUENAY RIVER, QUEBEC



the association only two-thirds of what it cost them to protect their own limits and has wiped out the menace of the small limit-holder, who never used to protect his territory. If a man owns fifty square miles, it would require two men for six months, with their outfit of canoe and tent and provisions, at a minimum of \$500, to patrol it, or \$1.60 per 100 acres. Under co-operation he gets much more efficient service for 40 cents per hundred acres.

The Quebec Department of Lands and Forests, under Hon. Mr. Allard, Mr. Déchene and Mr. Hall, deserves the highest praise for the work it has done in helping along this movement. These men have shown their broad-mindedness and their sense of responsibility for this great provincial asset placed in their care. In every way they have helped, often at political inconvenience to themselves from members of Parliament trying to save their constituents from punishment for infraction of the fire laws, as well as others who did not want to spend any money in protecting their limits. Mr. Allard is now at work on amendments to the provincial fire laws which will bring them up to date, make them easier of enforcement, and do away with some abuses. The settler and the woodsman, living so much in the wilderness, have naturally become ignorant of the law and contemptuous of it, but this condition is rapidly changing for the better.

Losses of Revenue

Of the 70,000 square miles of timber limits under license, about 10,000 square miles are burnt; these have not yet commenced to reproduce themselves.

At an average of 2,500 board feet per acre, this means a loss to the Quebec government of \$15,000,000 in stumpage dues, and, for the 8,500 square miles reproducing, but which will not be ready to cut for 50 years, a large loss of revenue, due to interest charges for this long period. When licensees awake to the fact that they are paying the government \$5.00 per square mile per annum for lands which they cannot cut during the next fifty years, and release these limits to the government, the loss of revenue will amount to \$90,000 a year.

The agitation for better fire protection has also resulted in closer utilization. Until recently, fire-killed timber was never cut, but now the larger companies cut all the trees on burnt-over land, and the government encourages this by a reduction in the stumpage dues, thus saving a great waste.

Education is Necessary

The great necessity is education of all classes of our people—the man in the street, the government officials, members of Parliament, lumbermen, business men, woodsmen, farmers, settlers and hunters, and above all the

children, for they will be the men of the coming generation; and often the only effective way is to educate the children. The Roman Catholic Church in the province of Quebec has done splendid work. His Eminence Cardinal Begin, Archbishop Bruchesi and Monseigneur Laflamme have for years sent special notices to all their parish priests to impress upon their people the necessity for care. The Department of Education, through its inspectors, has distributed leaflets to the schools in both languages, showing by pictures and by simple sentences the danger of forest fires.

The reduction in the number of settlers' fires has been remarkable, and, once the laws are enforced, it is hoped they will be a thing of the past. Members of Parliament are especially in need of instruction, for several times they have encouraged their constituents to fight arrest; they have influenced the magistrates, tried to use their influence at Quebec, and some have even paid the fines themselves. The magistrates have been very remiss in their duty in some districts, discharging offenders in spite of clear evidence and in some cases imposing fines of \$1.00, thus making a mockery of the law they are sworn to administer.

Improved	The railways, with one notable exception, have had
Conditions	a decided change of heart, and railway fires of any
Along Railways	seriousness are rapidly becoming a thing of the past.

The one exception is the railway directly under government control, the National Transcontinental. While the Hon. Mr. Cochrane has given instructions to have put into effect all that the Dominion Railway Commission requires, the order has not been fully carried out. The provisions for control during the coming year are still incomplete, in spite of every effort on the part of the Provincial Government and private owners to get the matter settled.

Workers in the woods are still in need of education, as ten per cent of the fires are still set by river-drivers. Woodlands departments are getting more strict, and, in the most progressive companies, setting a fire is now cause for instant discharge of the man and punishment for the foreman.

The proposed amendments to the present law, approved by Hon. Mr. Allard, and the better enforcement of the fire laws, will be a great step in advance. These changes will require permits to burn clearings at any time during the summer, will require all persons called on by a fire-ranger for help in extinguishing fires to respond under penalty of a fine, will fix minimum fines for infractions of the laws, so that a magistrate cannot make the law ridiculous by letting a man off with a one dollar fine, and will punish by imprisonment any deliberate setting of fire to get employment

in extinguishing it. Last year, trouble was caused by men setting fire in order to gain work, but, under the new law, this will be punishable by imprisonment without a fine, and a minimum fine will be imposed, so that magistrates will have no discretion but have to impose a sufficient fine if they find the person guilty.

Better Methods of Slash Disposal Required There is great need for better methods of slash disposal, and I believe that the only right method is the piling and burning of the branches and tops as soon as the trees are felled. A fire in a slashing is terribly destructive and almost impossible to fight, and, if there was no inflammable material of this kind, fires, except in unusually dry seasons, could never assume dangerous proportions and could be easily extinguished. If this is made compulsory on all lumbermen, it will be no hardship, because the added cost will be the same, it will be added to the price of the lumber and will have to be paid by the consumers.

The greatest advance in fire prevention methods will probably come in a year or two, through the use of aeroplanes or hydro-aeroplanes. This may sound impracticable, but it will not appear so when you consider how short a time it was since the aeroplane was a toy, while now it is the most vital part of the fighting forces in the war. There is no reason for not using it to protect our forests. In Michigan last fall, a rich aeroplanist undertook to help in fire protection and the amount of territory he has been able to cover was remarkable. This matter was taken up by the St. Maurice Association last spring, but, unfortunately, the high cost of hydro-aeroplanes (\$10,000, including duty and freight) precludes their use at least for a few years. But, when you consider that two men with an aeroplane can protect 10,000 miles more efficiently than fifty fire rangers, you can easily see that we can afford to buy the machines and hire experts to run them.

Educate the Public The great difficulty is that which Mr. Wentworth has already spoken of, namely, of educating people—of bringing home to every man the absolute necessity of taking care of our forests. I think the greatest benefit this Commission can render is precisely the same as that suggested by Mr. Wentworth in regard to fire protection in cities; that is, the necessity for starting some cheap, but effective, method to educate the children, to educate the ordinary man interested in timber, or the woods, or saw mills, or in any other way; and, above all, in educating the population who live on the boundaries of forests—the farmers and the settlers. To do this we have a great inertia to overcome. It is difficult to get people

in the mass to realize what they realize as individuals. Every intelligent man, when you talk to him about fire protection, agrees that it is very necessary, but men in the mass do not seem to understand this matter nor the necessity of meeting the difficulty. They are inert, they lack the stimulus, the initiative, to do anything. While they realize the conditions, they do not want to start on the remedy.

**Patriotism in
Times of Peace** We must realize that in this great question of forest fire protection there is a patriotism behind it all, a patriotism of peace, just as important as the patriotism that we have shown in this great war. There are slackers in peace times, just as much as in war times; and it is time for every one of us to realize his individual responsibility in this matter; to make government officials, who are responsible for fire protection, see that they are only public servants, that public office is a public trust, and that they have no political and no individual interest in this matter; that their duty is perfectly clear and plain, and is, first of all, to protect our natural resources—and that applies to every one of us, because, if each man realizes his responsibility, his representative will realize his responsibility too.

THE CHAIRMAN (Senator Edwards): When you referred to that annual loss, and spoke of an income of \$15,000,000, what did you mean?

MR. WILSON: I meant that the area in Quebec, which was burned over and not reproducing, amounted to about 10,000 square miles; that it is yielding no revenue and is producing no future stumpage. I estimate that the amount of timber which would be growing on that, and would be stumpage to the Government under ordinary conditions, would be \$15,000,000 at the end of fifty or sixty years. It is producing no crop, and is it not likely to produce any crop. Consequently, the Government is not getting any revenue.

MR. SNOWBALL: I was looking around to see if any representative of the New Brunswick Government, or of the Crown Lands Department of that province, was present. I would like them to be here, in case I should say anything they might feel was not absolutely correct and in accordance with the administration of their department. I would have been very glad if some of them could have heard Mr. Wilson's paper. In New Brunswick no concerted action is taken by the lumbermen for the protection of their forest areas. Senator Edwards, who is interested largely in Crown lands in that province, will bear me out in that statement. Further, if we wish to protect our timber areas we have to do it ourselves, and in doing

so, we have to protect many small blocks of four, eight or perhaps fifteen miles, that come in amongst our own limits, and are held by persons who will not bear any expense. We also have to protect the log holders, who have, presumable for farming purposes, but really for logging purposes, taken out grants in the midst of our lands, and are working these for logging agents in connection with pulp mills. At different times these men start fires to clear up small sections, so as apparently to conform with the law and the requirements of the grant which they have received.

The province of Quebec, I think, is now considering taking some action regarding fire protection which will afford protection to all Crown lands and lands in which the Provincial Government is interested, to make it bear equally on everyone, and so that all lands will be protected.

During the past year there have been very few fires in New Brunswick. One or two occurred in districts adjacent to where some of us are interested. In the case of one fire, I called up Col. T. G. Loggie, of the Department of Lands and Mines, and asked him to call out the fire rangers of the district, to try and overcome the fire trouble. He said: "Why, do it yourself; send your own men out to do it." I said: "No, it is not on my land, or near my land." However, he did send out one fire ranger, and, when that man put in his bill, it was not paid. I found the reason for not paying him was that the fire was not on Crown lands, but on a lot granted by the Government, used really for logging purposes. It started on this grant, and had been controlled there and had not, forsooth, burned any Government timber limits—and, therefore, he should not be paid for putting out the fire. That is the statement as given me by the man himself and not denied by the Government. I think it was very shortsighted on the part of the department not to pay the man, because the fire did not absolutely destroy public property. That is one of the reasons why I had hoped some representative from the department were present to correct me if I am wrong. I know I am right, however, because I made very strict inquiry in reference to this matter.

Fire Loss
Most Serious

I think probably Senator Edwards may have knowledge of what is occurring, because we happen to be interested in lands adjoining one another, and that section is not protected unless we do it ourselves. It is one of the most serious matters in connection with Crown lands. The loss from undersized cuttings and bringing out tops is infinitesimally small compared with the loss that may occur through fire. If the government of New Brunswick could be induced to

provide adequate fire protection, and appoint men who knew the woods, instead of appointing livery stable keepers, who never were in the woods—men, not appointed for political purposes, but who understood the woods and knew how to put out fire—it would be far better for the province, and would preserve our forest areas.

Mr. Wilson referred to the ultimate buyer of lumber having to pay the cost of insurance and all expenses from the source of production. I do not think that the buyer, in the case of pulp wood, or pulp product, or timber, would pay in the same manner as in the case of cotton, as we have to compete in open market. We have to take the prices governing in the world market, irrespective of whether we pay one dollar a thousand or fifty cents a thousand to protect the timber, or whether our slashings are destroyed.

MR. LEAVITT: In connection with fire protection along the Government railways, the situation during the past year has been much more satisfactory in New Brunswick than in any other province where the National Transcontinental railway operates. Mr. O'Leary, who is acting for the province as chief fire and game guardian, writes me that the co-operation they have secured from the Government Railways management during the past year has been satisfactory to the department. The railway management has furnished two power speeders, and one man for each, and the province also furnishes one man for each, so that they practically co-operate on an equal basis. These men patrol not only the railway track, but they watch for fires for a considerable distance on each side of the line. We can point to New Brunswick, in the past year, therefore, as being practically the only province able to secure a reasonable degree of co-operation with the Government Railways management.

The situation in Quebec has been much less satisfactory. In Manitoba, in the comparatively small mileage between Winnipeg and the Ontario boundary, conditions have been fairly satisfactory, because they have continued the special patrol men that the Board of Railway Commissioners prescribed should be maintained by the Grand Trunk Pacific. The situation in Ontario has not been discussed to any considerable extent, because the Provincial Government has put a man on at its own expense and expects to collect one-half the cost from the Dominion Government. This is a question that has been seriously raised.

One of these gasolene cars has been operating on the International railway, and, so far as the railroad protection itself is concerned, Mr. O'Leary considers the results have been

satisfactory. But they had one very large fire last summer, along the International railway, which caused damage estimated by the department at about \$100,000. This fire was caused, not by the railway, but by the lawless action of a number of settlers who set out fires in very dry pine; these fires spread and destroyed a considerable area of Crown timber lands. That situation has been due to the failure of the province to control the lawless actions of the settlers along the line.

MR. SNOWBALL: I would like to confirm what has been said about the railways. They have speeders, and Mr. Gutelius, General Manager of the Government railways, has declared his desire to afford every assistance, and his instructions have been according to that desire. No fires have occurred on the Canada Eastern section of the Intercolonial railway or on the line between Campbellton and Moncton. I have also known of a man going out from Newcastle, along the line, when an incipient fire was reported.

THE CHAIRMAN (Senator Edwards): I am glad that Mr. Leavitt has given us this explanation, because this is one of the questions about which the greatest difficulty has taken place—the Government railways through New Brunswick.

Referring to the very admirable paper by Mr. Wilson, I quite agree with my friend Mr. Snowball, that any obligation imposed on the lumberman will not be paid by the public. If we could bring about that result, we should have made some profit during the last two or three years, whereas we have not been doing so. The lumber question is a very large one, it is world wide, as we compete with the world. In fact, the lumberman in eastern Canada does not fix the price. Our price is made on the foreign markets. I would be very glad indeed if we could control the prices, but we cannot.

A word about the matter of slash. If fires did result very largely from that source, certainly some drastic means should be taken, but, as a lumberman, having an experience extending over fifty years, and dealing with very large limits myself, I will frankly say that I have never known of a fire on our limits from that source. My own conviction is that, with the mere lopping off, the slash dies and becomes damp in a very short time. There may be occasions when fire starts from that source, but they are very rare.

Conservation of Our National Traditions

BY

MONSEIGNEUR CHOQUETTE

*Professor, Seminary of St. Hyacinthe, and Member of
Faculty, Laval University*

HUMANITY is divided into two great classes—consumers and producers. The history of the most remote times holds up to our admiration and appreciation the pastoral life of the patriarchs under the old dispensation and that of the farmer kings of primitive Egypt.

Always and everywhere public sentiment has exalted the function of him who draws from the inexhaustible fertility of the soil, life for himself and his fellow-man, of him who contributes to the development of the one source of social riches, namely, the land. Always and everywhere art, music and poetry have celebrated in noble terms the august occupation of the sower. The Holy Scriptures add that he who makes two blades of grass to spring up where formerly there grew but one, is a public benefactor.

On the contrary, this same public sentiment has had and can only have scorn for and an instinctive repulsion towards the man who, neither in his own person nor in that of his ancestors, has ever gained his subsistence from the earth or worked with his hands. So true is this that the acquisition of wealth, the merit of undeniable talent and the practice of private virtue cannot efface the stigma which attaches to one great race, the most ancient in the world, and which characterizes its members in all parts of the earth. And why? Because for centuries these people have never been anything but consumers.

Canadians are
Producers

Thanks be to God, we Canadians belong to the noble class of producers. Most of us can trace our lineage back to a farmer. Either we ourselves, or our ancestors, have cultivated the soil; we have directly or indirectly drawn from its bosom the bread and meat which feed us, the clothes which cover us, the fuel which warms us, the wealth which circulates throughout the great organism of human society. Scotch, English, French, we are all producers.

Last summer, the peasants of Artois and Flanders believed they saw in the red poppies, which covered their untilled land, the blood

shed the previous autumn by their fellow-countrymen and defenders, mixed with the blood of more ancient peoples fallen on this perpetual field of battle. We ourselves might imagine, and with more justice, that the flowers which adorn our large cleared fields, which border our roads, their colours agreeably harmonizing, have, as it were, proceeded from the sweat of our forefathers who applied to them their glorious, common labour, and conquered for us the rich material and moral patrimony which we enjoy. Herein resides our strength and is found the very marrow of our national traditions.

To-day, we are exposed to the danger of being despoiled of this noble grandeur, of seeing our traditions effaced by the very excess of wealth which they have brought us. Agriculture is not holding its own. The farmer's son lays down his task; he flees far from it; he hurries

"Comme s'il entendait l'épouvante d'un crime
Cheminer, haletante et terrible, après lui."*

History tells us that the discovery of America had on the Spanish character an effect the like of which is not known in the life of any other people. American gold gave Spain an unhealthy stimulus that proved fatal.

Fascination
of the West

A similar calamity threatens the old provinces of the Dominion. The discovery of the great and fertile plains of the West fascinates our young people. The railways offer them a thousand easy means of yielding to the temptation of the unknown, of seeking a state which will not be that of their fathers. Doubtless these thousands of immigrants who rush to take the Canadian eldorado by storm, need some directing heads. Doubtless, also, some will continue the function of the sower, to which they were brought up, on those vast plains. It is a half misfortune perhaps, but it is a misfortune, none the less, and our old provinces, whose soil is generous enough still to sustain several generations, lose by this exodus their old courage and their hope for the future. Domestic and national traditions are extinguished in ambitions against which nothing seems able at present to prevail.

Our Commission has undertaken the task of conserving our national resources. It wishes to develop all that may contribute to increase the greatness and power of our country at home and abroad. Our forests, our waterfalls, our mineral deposits, game and fish, are all the objects of its proper solicitude. And lastly, has not its attention even been extended to the birds which people the rocks on the gulf of St. Lawrence? On behalf of this numerous

*" As if he felt the spectre of a crime
Behind, in breathless, terrible pursuit."

population which has no value except in its variety and in the graceful movements of its untiring flight, this Commission has pleaded in touching words.

Conservation
of a Higher
Order

I ask to-day that it should devote itself to conservation of a higher order, to the conservation of ideas and sentiments, that it should redouble its efforts to retain attached to the ancestral soil, to the old patrimonial estate, the cherished battalion of sons and daughters of our farmers who are preparing to steal away under another sky.

Our soldiers will soon be returning from the blood-stained battlefields overseas. They will come back crowned with the laurels of victory. They will have acquired, along with the spirit of discipline and wisdom in behaviour, an aversion for exaggerated ambitions and a love of the peace which is found in self-respect and honest toil. It is towards them that we ought to direct our efforts. Some of them are sons of the soil. They will return to it if we can inspire in them a taste for the healthy needs of the life of the fields. And what means can we employ? This is the concrete question which we must ask ourselves.

Develop Love
of the Land

Permit me to offer some suggestions. First of all, we must develop the love of the land. We must instil this sentiment in young and old by literature, by teaching, by the consideration with which we shall surround all that belongs to the art of agriculture. The press, as you know, is the most powerful instrument of propaganda and of influence. Our common enemy, the ambitious German Empire, has given us most striking testimony of this truth. We may with profit draw lessons from the enemy, *fas est et ab hoste doceri*. What is it that has made that country the provider for all the nations? What is it that inclined us to believe that an article *made in Germany* was in all respects a desirable product, both by its intrinsic value and by its low price? Why is it that this belief finished by extending its grasp upon the largest European and American firms to such a point that competition ceased and that, on the day when the British fleet closed the ports against the export of German goods, the industry of the world became dislocated and incapable of supplying its own needs. This immense and baneful domination was begun and propagated by literature, the press, printed matter in all forms. Again, what is the source of the Teuton soldier's resistance, which holds on in spite of all, in spite of the real powerlessness of its efforts—for, as you know, an army of invasion which does not advance is inevitably doomed to retire?

Power of the Press The source of this furious resistance is literature, newspapers and magazines. Forty years ago, the word went forth and was repeated from millions of throats: Germany must dominate the world. This savage cry penetrated everywhere. Children repeated it like a creed. In the elementary schools they even gave their weekly pennies to swell the budget of the army and navy. Each new battleship became a means of conquest; each engine of war a pledge of victory and of final domination.

The mass of Teutonic soldiers has been imbued by this propaganda. Each one of them fights for the realization of his ideal and the war is individual as much as collective.

This immense work accomplished for shame and evil holds a lesson for us. It teaches that a more moderate, but not less active, press could promote the works of peace, especially that which is the most fruitful expression of them, namely, work on the land.

Agricultural Literature for Schools I would multiply to the extreme literature touching the tilling of the soil. Little stories, simple and true, illustrated and without exaggeration, with the names of the persons and places, would preach in the schools the nobility of agriculture, as well as the good fortune, the happiness, the true satisfaction, even the vanity, which this art brings to the individual and the family. Who has not read with admiring interest the story published in the newspapers, last autumn, concerning that young farmer, in Saskatchewan, I think, whose wheat was awarded first place by a jury? The report of this success told about the ambition of the winner to carry off the prize from his competitors, the selection of the seed, the repeated sowings, the care to preserve the crops, all which was truly interesting and as captivating as the tale of a great victory.

Understand Nature of the Soil I would also that the farmer knew better, that he might love it the more, the nature of the soil which he exploits, the elements of fertility which it contains, as well as, and above all, the elements which are lacking to produce with profit this or that crop. In a word, I wish that he should be taught a little more of agricultural chemistry.

I have visited the peasants of France, Belgium, Switzerland and Italy. Certainly their condition cannot be compared to that of our *habitants*. The latter would be *seigneurs* in the eyes of their fellows in Europe, yet they would be inferior if they had to pass an examination in agricultural chemistry. Several times I have heard Belgian peasants speak of nitrogen, phosphoric acid, potash and lime, as ably as a professor. "Here," said one of them to me, "is a

field which needs nitrate; it would grow nothing without that. Over there I shall put rather some phosphate with a little potash." I took an extreme pleasure in their conversation, and I asked myself if our Canadian farmers, even the best educated among them, would be able to show as much knowledge.

**Social Status
of the Farmer**

Nevertheless, literature and teaching would perhaps not suffice to attach the farmer to the soil if he felt that his social status was not the object of special consideration. To acclaim him as the foster-father of the human race, as the king of the earth, a hero as great as he is simple, no doubt flatters his inner senses. But it is also necessary that his person and his family should derive some concrete good from these glorious qualifications.

I do not know if it is still the case, but I have learned that the gentleman farmer enjoyed in England, not very long ago, privileges and honours which made him a considerable man in his own neighbourhood. If I am not mistaken, the English gentry is made up of the rural land-owners. To the gentry perhaps more than to her statesmen, England owes the stability of her institutions, the power of her traditions and her real social strength.

Now, what contributes to the continuance of this important class, is the consideration which is accorded it. Everywhere, the English gentleman has the right to exercise the authority of chief officer and magistrate. He shares in the deliberations of the grand jury. He is present at the greater sessions and at the petty sessions of his district. He is a member of the board of guardians and of the vestry. He is manager of a savings bank, commissioner for the income tax, etc.

The fulfilling of these duties gives him more importance in his own eyes and in the public admiration, and prepares his way to Parliament, where he will be able to speak with authority and experience. While waiting for that happy day, he extols his life of joyous contentment. Listen to the poetical words of one of them. "I am," says he, "one of the people, a rustic among rustics. My white house with its green shutters is situated on the slope of a shady hill. For a court I have a poultry-yard, for a stabling a cow-shed. For a flower-bed, I have a vegetable garden, and for a park a pretty orchard."

The farmer does not ask merely to be taught, to be surrounded with consideration and honour. He asks especially—and it is to this point that I wish particularly to draw the attention of the Commission—that everything be taken away which might turn him from his labours and deprive him of the benefits of his work. I am far

from thinking of taking him from the duties which arise from his title of Canadian, duties which at periods of great commotion, such as that through which we are now passing, extend to the giving of his money, his strength and his blood. Such duties are according to order. They even aid in attaching him more deeply to his title of land-owner.

Allurement of Speculation But there are other causes of distraction, and these are strong and fatal. I will mention the allurements which pursue him and will follow him even to the most distant parts of our rural districts. Few days pass when farmers, young and old, are not asked to take part in financial concerns, in speculations which dangle untold riches before their longing eyes. The agents are clever and persevering. They have a thousand strings to their bow. Town lots, mining claims, natural gas and oil wells, patents, are all means of enticement, all the more alluring since the risk which accompanies them is hidden more or less honestly under the name of some master of finance, or by an advertisement cleverly inserted in a conspicuous place in a newspaper of wide circulation. It is a veritable scourge, a plague. One must live in the country and hear the wails of the victims, to grasp the whole situation. I do not think that I exaggerate when I declare that in the one county where I live, \$100,000 and more have simply been thrown away by our farmers. Some of these, seized by a fatal frenzy, have not hesitated to sell their beautiful farms, the heritage received from their forefathers, in order to barter the value for a scrap of paper which guaranteed them the ownership neither of an inch of land nor an ounce of silver.

Intervention Should be Provided for Can this evil not be remedied? Is it necessary to leave the farmer to learn wisdom at his own expense by becoming the prey of greedy plunderers? Is it necessary to allow him and his descendants to be deceitfully allured from their ancestral calling and brought to ruin?

It seems to me that the men chosen for the good administration of public affairs could find in the arsenal of the existing laws, or in a new law enacted for this object, solid grounds for intervention.

Has not our Commission, whose object is to promote the right use of our undeveloped national resources, *a fortiori*, the duty of preventing the foolish wasting of acquired wealth. It is a good thing to prevent forest fires; it would be still better to stop the squandering of the savings of the people.

I wish that, as is practised, I believe in the older countries, no individual or syndicate might be allowed to solicit a sum of money without being previously armed with an official certificate certifying

to the public utility of the enterprise which is being promoted. Such a regulation would abolish many snares.

I sum up these remarks by urging the Commission to interest itself in the great class of Canadian producers; to seek means of increasing the scope and influence of the farmers by instruction, by consideration and honours, and, above all, I ask that they be protected against the financial sharks who become rich at their expense and give them a distaste for their vocation.

I ask you then to conserve that which is dearest to the hearts of a people, namely, its traditions.

THE CHAIRMAN (Senator Edwards): I am sure you have all listened with great interest and pleasure to the paper just read. If the Commission can do anything to protect individuals against these very rapacious animals that go about devouring, I am sure it will do so. There is something that the laws of the land can do, in so far as corporations are concerned, and I have no doubt that in this respect protection can and should be extended beyond what it is to-day under the ordinary laws affecting joint stock companies.

MGR. CHOQUETTE: It would be easy for either the Federal or Provincial Government to put greater restrictions on the granting of charters. They could be given only to corporations that would be recognized as public utilities.

THE CHAIRMAN: You would not like to see the authorization of about one million dollars capitalization on twenty-one foxes.

DR. J. W. ROBERTSON: I want to express my appreciation of this excellent paper of Mgr. Choquette. The conservation of good habits, of right living among the country's people, is the most important conservation we have to consider. It is difficult of achievement, but something could be done, at least, as a wise beginning. I would heartily support the most vigorous legislation to provide for the licensing of any man soliciting subscriptions for stock from the rural population. That would be a step in the right direction. Some of the states have done that with great success.

May I take this opportunity of bringing before the Commission a matter which I consider important. All of these papers contain the very best of suggestions. I think suggestions are sometimes lost sight of through not being brought into smaller compass and embodied in the form of resolutions. I think we should not drop the suggestion of a fire prevention engineer, for instance, or perhaps a branch of the proposed Civic Improvement League for Canada would cover that. I think there is a field for just such an official.

In view of that and other suggestions that have been made, I propose, if you think kindly of my suggestion, that you should appoint a committee on resolutions, to meet immediately after the lunch hour, and individuals or the Commission might submit suggestions to that committee. In that way we could avoid having these good ideas lost sight of from session to session.

THE CHAIRMAN (Senator Edwards): The suggestion is a good one, it was on my mind, and I think it should be done. There should be a committee on resolutions, to bring before the authorities any suggestions brought out here that they may regard as desirable. I suggest that the Committee be composed of Dr. Bryce, Dr. Robertson, Dr. Jones, Mr. Snowball, Dr. Adams, Mgr. Choquette and the Hon. Mr. Brown, with Dr. Robertson as convener.

The Conservation of Our Northern Mammals

BY

C. GORDON HEWITT, D.Sc.

Dominion Entomologist

THE previous speakers have been dealing with the resources of Canada, which, even if destroyed, are to a very large extent replaceable. No one will deny that we can rebuild houses or re-forest land in time. But I wish to deal with some resources in northern Canada which, if destroyed, are irreplaceable. I have been asked to speak in explanation of a memorandum which I have prepared for the Commission in regard to the question of the conservation of our northern mammals. It will simplify matters, if I read this memorandum to you, as it is one which is to be presented to the Committee on Fisheries, Game and Fur-bearing Animals for its consideration and for subsequent submission to the whole Commission. I will also explain one or two points in order that the Commission may have information upon which to make recommendations, or, at least, to discuss the matter later:

“Referring to the memoranda that I prepared for the Commission in the summer of 1914, relative to the protection of the caribou and muskox in particular, in the northern territories:

“Certain recommendations were made in my memorandum of July 27, 1914, regarding very necessary amendments to the Northwest Game Act, 1906. I understand that the amendment of the Northwest Game Act is now under consideration by the Department of the Interior, and, as I have had further opportunities of looking carefully into the questions previously discussed, and of considering further requirements in the matter of the conservation of a number of our larger mammals and wild life in general, I beg to submit the following recommendations, which not only incorporate my former ones, but go further and deal with certain cognate matters. In this further consideration I have been materially assisted by personal conferences with Mr. T. S. Palmer, in charge of the Game Protection Division of the United States Biological Survey; Dr. W. T. Hornaday, Director of the New York Zoological Park, and undoubtedly our leading authority on the conservation of wild life on the continent; and Prof. Henry Fairfield Osborn, President of the American Museum of Natural History and of the Zoological Society of New York.

Amendments
Suggested

"As the amendment of the Northwest Game Act is most urgently needed, I would respectfully suggest that the Committee on Fisheries, Game and Fur-bearing Animals be asked to consider the following recommendations, with a view to recommending such action as may be considered necessary.

1. That amendment of the Northwest Game Act of 1906 is most urgently needed to meet changed conditions and to prevent the continued and rapid extermination of certain economically important animals referred to later.

2. That it is very desirable, in order to secure proper and efficient administration, that the Northwest Game Act be administered by the Commissioner of Dominion Parks, as his Branch is already charged with the protection of game, and he can give the matter more of the close attention and supervision that it requires or is possible under the present arrangement.

3. That the rigorous protection of the wild or "wood" bison or buffalo be continued.

4. That more protection be given to the caribou, which is rapidly becoming diminished in numbers in the north for want of adequate protection, by providing for the following in the Act as amended:

(a) The prohibition, absolutely, of the killing of female or yearling caribou; the prohibition to extend to Eskimos and Indians.

(b) The prohibition of the export of caribou skins except under license, which should not permit the export by *bona fide* hunters or other duly authorized persons of more than two skins and heads under permit of the Sub-collector of Customs stationed at Herschel island, who should be *ex-officio* a game warden under the Act.

5. That more protection be given to the musk-ox by providing for the following in the Act as amended:

(a) The prohibition of the killing of musk-ox, except under license, which should not permit the taking by *bona fide* hunters or other duly authorized persons of more than two skins and two heads under each license. Natives or *bona fide* explorers to be allowed to kill musk-ox for food for their own use but not in order to secure the skins.

(b) The prohibition of the killing of musk-ox on Victoria, Banks and Melville islands, thereby constituting these islands as permanent reserves for musk-ox and as centres for its natural distribution to other parts.

6. That a close season be included in the Act for white fox, from April 1 to November 15. This animal is sorely in need of such protection.

7. That competent game guardians be appointed by the Minister of the Interior to carry out the provisions of the Northwest Game Act in the region between the Alaskan boundary and Herschel island on the west and Coronation gulf on the east, to act in addition to the Royal Northwest Mounted Police."

Protection of
Caribou

The caribou referred to is the barren ground caribou, not the wood caribou. The barren ground caribou is found in the region east of the Mackenzie river.

Its distribution and winter range are indicated on the accompanying map.

At the present time, you would seldom meet with a caribou west of the delta of the Mackenzie river and north of the Porcupine river, whereas, ten years ago, thousands were to be seen in that region. They have been exterminated and that extermination is now going on from the west and east of our own barren grounds. We have been accustomed to speak of caribou as if they occurred—as we know from the evidence of people who have been there that they did occur—in millions, and, when you speak of millions of animals, you begin to think of extermination being impossible. But you have only to remember the fate of the buffalo to see the falsity of that idea. The buffalo occurred over the middle and northern part of this continent in countless millions, and yet, but for the foresight of the United States Government and of our Government, it would undoubtedly have been extinct before this. Fortunately, it was caught just in time, and now it is gradually increasing in numbers. But that is a case where, on economic grounds, reduction in numbers might be considered justifiable, as the buffalo was occupying rich lands required for agriculture. But the caribou is not occupying agricultural territory; in fact it is the only extensive superterranean natural resource we have in those northern regions, and, therefore, for the sake of the inhabitants of those regions, and for the future development of any industry that might arise, preservation of the caribou is necessary from a national standpoint. Of all large animals it is the one most easily exterminated, and its extermination is rapidly going on. Attention was called to this by Stefansson in 1914, and that was one of the reasons for our taking up this question at that time. The caribou is required to preserve a constant supply of clothing and food for the northern tribes of Indians and the Eskimos. The latter feed on them from May until September, after which season they go north and feed on the seals.

160 155 150 145 140 130 120 110 100 90 80 70 65 60 55

Commission of Conservation
Canada

MAP SHOWING APPROXIMATE DISTRIBUTION OF
BARREN GROUND CARIBOU (*RANGIFER ARCTICUS*)
AND RELATED FORMS IN CANADA

Legend

- Summer Range
- Winter Range
- Winter and Summer Range (approximate)

(After Preble, Northern American Fauna N° 27)

Scale
0 100 200 300





**Destruction by
Wolves**

Not only is the caribou being reduced by the traders and whalers, who are arming the natives with rifles and other means of killing them, but the wolves, also, are responsible for a large decrease in the numbers of caribou. That is a matter which should be taken up by the Department of the Interior, with a view to getting the Eskimos to kill the wolves and assist them in the export of wolf skins. If this could be accomplished and the trade in caribou skins suppressed, it would assist very materially in gaining the end we have in view.

The first recommendation made in the memorandum is that the Northwest Game Act should be amended. Anyone who has looked into the question of the conservation of our game in the Northwest Territories must realize that the Act, passed in 1906, is now quite inadequate, and that it requires very positive amendment to meet the changed conditions of the present time, even if these recommendations should not be inserted in the new Act.

**Administration
of Game Act**

The second recommendation is in regard to placing the administration of the Act under the Commissioner of Dominion Parks. At present the Act does not appear to be administered by any special officer. True, the law clerk of the Department of the Interior issues the necessary permits provided for under the Act, but, for the efficient administration of the protective provisions of that Act it must be under some appropriate officer; otherwise its efficient administration cannot be secured. To carry out this very vigorous and much needed policy of game protection in the Northwest, the Act should be administered by the Commissioner of Dominion Parks, who already has control of the conservation of game in our large national parks, and has the basis of the necessary machinery.

**Very Few
Wood Bison
Remain**

The third recommendation is that the vigorous protection of the wild or wood bison be continued. I think that needs no further explanation. There exists only a comparatively small number of wood bison, which is regarded as a distinct species by many authorities from the plains buffalo or bison now corralled in our national parks. These wood bison are in the neighbourhood of Fort Smith, and their numbers are estimated to be about 400. The Forestry Branch of the Department of the Interior has at present a special officer detailed to look after them.

It is of great importance to prevent their reduction in numbers. It is a zoological fact that, in the decrease in numbers of a species of animal, there is ultimately reached a stage where recovery is impossible, because of so many adverse factors, chief of which is the fact that the wolves take the calves or fawns, and a stage is thus

reached, where, whatever you may do, you cannot get back the numbers. That will be the fate of the antelope in our western provinces.

Turning now to the recommendation concerning the further protection of the caribou. I have already briefly discussed this animal. The chief reason for its rapid extermination is that traders and whalers are getting into the country, particularly above Coronation gulf, and are supplying the Eskimos with firearms and other means of rapidly killing caribou, whereas formerly the Eskimos were content to kill all they needed for food with bows and arrows. Now they are encouraged to get all the pelts they can secure for traders and dealers, who take them to Alaska, where they now have few caribou, and elsewhere. Having none themselves they come into our northern territory and encourage the Eskimos to exterminate ours. That is a condition we cannot permit.

Musk-Ox The musk-ox is another animal that is being very
Being rapidly exterminated. Three years ago, when dis-
Exterminated cussing this subject with Dr. Henshaw, Chief of the
United States Biological Survey, he said: "It seems to me, unless prompt and effective measures are taken for its preservation, it too, must soon be numbered among the animals that were but now are not." Traders and whalers are very anxious to get the hides of musk-ox. It is just a pelt-hunting proposition, and they are being hunted by the Eskimos. On the lower part of Victoria island and Coronation gulf the destruction of musk-ox is not so extensive as that of caribou. The probable distribution of the musk-ox is indicated on the map facing page 34. It is interesting to note that if the musk-ox were left to itself, if we had not this commercial hunting by Eskimos and Indians, who are paid for the pelts, it would possibly continue to exist, without any considerable decrease, owing to the natural difficulties of the barren grounds in the region south of Bathurst inlet. The Dogrib, Slave and Yellow Knife Indians from the west and southwest and the Eskimos from the east, hunt the musk-ox from their respective regions. The Indians from the west cannot get into the centre of the country because of the natural difficulties of camping, etc., so there might always be a nucleus which neither Eskimo nor Indian could reach. But, with the temptation of reward, they will destroy every musk-ox they see. The Eskimos and Indians, however, are not the only people who destroy these musk-ox.

Sportsmen One of the worst enemies of the musk-ox is the
are Serious so-called sportsman, and some of our best ones,
Menace who have international reputations, are simply
butchers where musk-ox are concerned. I have had evidence from the United States of the fact that one man, with a great reputation

as a hunter, simply shot these animals like so many sheep. Such wanton destruction cannot for a moment be tolerated and steps must be taken to render it impossible.

The musk-ox is a singular animal. It has little sense of danger, and does not take care of itself, possibly because of the character of its life. It has lived in deserted regions, and does not know the white man as a dangerous animal. It is really no sport to shoot musk-ox. Therefore, I think we should have some restriction, such as I have recommended, in regard to the number of musk-oxen which sportsmen, under license, are allowed to kill, also the number of pelts or hides that may be brought out.

The foregoing, I think, are the chief points I wish to bring to your attention in regard to the animals in question.

A close season for white or Arctic fox is very necessary. The white fox is seriously decreasing in numbers and its protection is not provided for in the Northwest Game Act.

It may appear to some of you that it would be very difficult to enforce close seasons in the case of the Eskimo. As a matter of fact, it is not. According to the experiences of the Northwest Mounted Police, the Eskimo carefully observes close seasons; he will take a calendar and mark on it the close seasons for different animals; and he will know very well the day when the close season begins or ends.

Competent Game Guardians Essential The appointment of competent game guardians is most essential. If the government is to adopt any progressive policy in regard to game protection in that northern country, it must have some men with little else to do but look after the game. At present a number of persons are constituted game wardens, chiefly members of the Royal Northwest Mounted Police, who have accomplished excellent work. But we all know their multifarious duties, and the mounted policeman may not always be able to specially visit sections to ensure the carrying out of the provisions of the Act. There should be special game guardians in addition to the Mounted Police.

I think if these recommendations are adopted by the Commission, and put before the Government, they would stand a very great chance of being adopted. The Commission of Conservation has a very great influence in matters of this kind; in fact the Government looks to it for advice in such affairs. I hope the Commission will therefore see its way, with this explanation, to adopt the recommendations, should the Committee on Fisheries, Game and Fur-bearing Animals bring them up.

Looking to the Future It is a very important national question; I regret that there is not time to deal with the matter in its larger aspects. The experts of the Commission appreciate them, as well as I do. We are often told that, while we boast of the size of the country, we have that enormous northern territory which is no good for anything. I do not look at it in that way. I conceive a time in our history when the whole of that northern country will be productive. Here, then, are some resources that will ultimately be very important in their relation to the production which we shall hope to secure from that immense territory. For that reason it is very urgent, at this time, that action should be taken.

Conservation Cannot be Delayed In the conservation of wild life we cannot postpone action from year to year, because all the time the animals are being reduced in numbers and exterminated, and they ultimately reach a stage where, however pious may be our wishes and intentions, we cannot bring them back. These are valuable natural resources and can be protected for the future. For that reason I think we should take very energetic action now and leave no stone unturned to secure proper and adequate protection for these animals.

DR. BRYCE: I was very much interested in the paper which has just been given us. You may count on the western people to thoroughly support this movement. I believe the four western provincial governments are all interested. Manitoba now goes to the sixtieth parallel and part of that country is under Dominion control. I believe the feeling is very strong to co-operate with the Dominion in this matter. I think we can count on the local governments doing their very best. These suggestions seem to me very practical, and some action should be taken to give them effect. To an old timer, it is very interesting to hear these details. I remember going into the Hudson's Bay Co. store in Winnipeg, about 1880. There were then one thousand buffalo robes in the store and I bought three for \$14. You can see the change now, and realize the tremendous loss that has occurred; in fact, it is hard to get a buffalo skin at all. It is the same with all the game. The stories we get of the diminution of the musk-ox are striking. I would, in any way possible, support this movement. I approve of the suggestion of making men entirely responsible for the enforcement of the Act. The appointment of the right kind of agents to carry out the Act is the only hope.

THE CHAIRMAN (Senator Edwards): I suggest that before we part a strong resolution should be drawn on the lines suggested. It is a highly important question, and is one of the subjects in which

New Brunswick leads. Moose are more plentiful there today than they were twenty years ago. Nova Scotia has done a great deal and so has Quebec; but certainly, in this respect, New Brunswick leads. We have with us Dr. Wilson, who is familiar with that whole country. Perhaps he would say a word or two.

DR. C. W. WILSON (Assistant Surgeon, R.N.W.M.P.): I have listened with pleasure to the paper. Certainly the Northwest Game Act, if there is any in existence, is not operative above Fort Smith, the northern limit of the province of Alberta. Acting as magistrate in the Royal Northwest Mounted Police for three years, I have had several of these questions to determine, and, in many cases, I have had to deal with such matters as the collection of beaver skins, etc. There is no law above Fort Smith in matters of game or fur protection, and the Indian can kill and destroy all he likes. Where moose were quite plentiful, in the region included within the delta of the Mackenzie, the greater destruction has been due to the trading companies, for instance the Hudson's Bay Co. Two Indians have told me they have supplied that Company's post with two hundred carcasses a year of moose alone. The result is that very seldom is a moose seen in that whole district at the present time.

Indians are Destructive Speaking of the caribou, very few are to be seen west of the Mackenzie today. There is still a considerable migration of caribou as far south as Chipewyan and lake Athabaska. The great destruction of these animals has not been for their pelts alone. While the pelt is of value, it was the lust of killing that exterminated them. Mr. Frith tells me that, when in charge of posts there, he refused to sell the Indians powder and bullets, because they had more than were required for their supply of meat, etc., and the Indians would kill the caribou and take only the tongues and skins.

There will require to be some legislation to protect the white fox, because they are rapidly disappearing. The year before last, I am sure that very few white foxes were obtained in the Mackenzie district; those obtained came from farther east.

I do not know of any special legislation in regard to the musk-ox in the Northwest Territories. Alberta does administer her Game Act, and there is a wholesome regard paid to it as far as Fort Smith; beyond that there is no attention paid to any Act.

The large herd of wood bison is just west of Fort Smith at present, and is looked after by a man who has special charge of these animals.

It is unfortunate that, on account of fires, the reindeer sent up last year stampeded and were entirely lost. We have heard nothing

more of them or as to whether or not they are breeding. A few are still in existence and are kept on an island near Chipewyan.

Indians start
Forest Fires I would like to say something as to fires. The northern Indians burn large areas of country to produce young growth along the rivers for the moose. At the same time they destroy the small growth on which the lesser animals feed, which is affecting the fur product of the country. Fire ranging is an urgent necessity north of Fort Smith, but no regard is paid to it whatever. There are sections of merchantable spruce along the river which ought to be protected. For the administration of this Act in the Northwest, the Mounted Police are the best, as they seem to secure obedience. The fire rangers I have seen do not do much; they simply have a good time along the rivers, and I do not think they pay much attention to business. The Mounted Police, if given power, would see that the Act was carried out.

Eskimos Observe
Close Season The statement that the Eskimos are respecting the law, and keeping track of the close seasons by means of calendars, is true. They are a superior people, and they appreciate that the preservation of the fur depends upon a close season; and, although this is not required, many of them will not kill meat out of season. They are preserving the animals for their proper season; quite unlike the Indian, who traps mink all summer, and destroys everything he sees, male and female, calves, fawns and everything else.

MR. SNOWBALL: Was there not a serious epidemic, six or eight years ago, along the Mackenzie river, which greatly depleted them?

DR. WILSON: I had not heard of that.

Report of the Committee on Forests

BY

CLYDE LEAVITT

Chief Forester, Commission of Conservation

DURING the past year, work in forestry and fire-protection has followed closely the lines previously laid down, and only minor new developments can be reported. The war has, to a great extent, prevented consideration of needed new legislation, as well as of certain changes required in policy, procedure and organization, in most of the forestry and fire-protective services throughout the country. These needs have been referred to in previous reports of the Committee on Forests. It is to be regretted that so little progress can be shown, especially in matters where the efficiency of the work could be materially increased at no additional cost.

There will, no doubt, be a great demand for Canadian timber for reconstruction in Europe following the conclusion of the war, as well as for war purposes in the meantime. The home demand is also increasing, and conditions in the lumber industry are again becoming normal, particularly in the West, where a serious depression has existed. There is every reason, therefore, why all possible measures should be taken to conserve our forest resources, not only in the interest of Canada, but of the Empire as a whole.

**Dominion
Forest
Reserves** There have been no additions to the Dominion forest reserve area during the past year, consideration of such matters by Parliament having been postponed on account of the war. The present area of permanent forest reserves on Dominion lands is nearly 36,000 square miles, and some 20,000 square miles additional have been set aside with a view to being later reserved permanently. The Commission should exert its influence to secure the permanent reservation of all non-agricultural forest lands as rapidly as the necessary information is secured.

**Civil
Service
Reforms** Another development which has been retarded by the war is the establishment of the merit system of appointments in the field service of the Dominion Forestry Branch. In this branch, as also in the provincial fire protective services, the greatest obstruction to efficiency is the continued selection of fire rangers on the basis of political considerations, rather than of fitness to perform the responsible duties of fire rangers. The patronage

system is both inefficient and uneconomical, and Canada need not expect adequate protection from forest fires until fire rangers are selected on the basis of merit. This could be effected without additional cost, and would accomplish more than an increased monetary outlay. It is understood the placing of the fire rangers of the Dominion Forestry Branch under Civil Service regulations has been delayed pending the enactment of the new Civil Service Bill. Such transfer could, however, be made effective at any time by order in council, under existing legislation. Even under the proposed new Act, it is understood that an order in council would still be necessary.

**Reorganization
in Fire-
Ranging
Services**

At the last annual meeting, Mr. H. R. MacMillan, Chief Forester, British Columbia Forest Service, emphasized the need for complete supervision to make a fire-ranging system really effective. He made the statement that, because of lack of field supervision, more money is being wasted in fire protection than is used economically. While this is a broad statement, it is believed that the facts fully justify it.

In both Ontario and Quebec, there is reason to believe the amount of co-ordination between the head office and the field is too limited to secure adequate supervision over the fire-ranging staffs. The success achieved by the St. Maurice and Lower Ottawa Forest Protective Associations has been due to the thorough supervision exercised by the relatively high number of inspectors, who, in turn, are closely supervised from the head office. It is believed that the several provincial governments could materially increase the efficiency of their fire-protection force by taking advantage, in the above respect, of the experience of the British Columbia Forest Service and of the St. Maurice and Lower Ottawa Forest Protective Associations.

**Collection of
Statistics**

The collection and publication of statistics of forest fire losses has received increasing attention in recent years. Progress is especially notable in Western Canada. In Eastern Canada, as a whole, the forest fire losses have not been known, due to incompleteness of data. It is important that information on all fires be collected not only as to the area covered but also the amount, character and value of the property destroyed, in order that the intensity of fire protection may be adjusted to the conditions and afford a basis for the administration of the area in other respects.

**Co-operative
Forest
Protection**

The value of co-operation in fire protection is evidenced by the continued success of the St. Maurice and Lower Ottawa Forest Protective Associations, which now patrol an area of more than 16,000,000 acres in Quebec. The organization of a similar association by the

limit-holders on the upper head-waters of the Ottawa River is still under consideration. There is no question but that favourable action would mean great improvement in fire protection in this district during future years. Similarly, co-operative associations would greatly improve the situation in Ontario. The great obstacle appears to be the tremendous inertia prevalent, although there are some exceptions. The result is the continuance of obsolete methods of fire protection, which are both uneconomical and inefficient.

**Slash Disposal
on Public
Lands**

Elimination of fire hazard is essential to fire prevention. The safe disposal of logging slash would materially reduce the danger and damage of forest fires. This practice is now provided for in sales of government timber on the National forests of the United States. There is also legislation, requiring a measure of brush disposal, affecting privately-owned lands, in eight individual States. If the application of this requirement to lands in private ownership be justified, on the basis of public interest, how much more necessary and logical is it that adequate measures be taken on public lands, which, in Canada, comprise a very large percentage of the forested area.

On the more recent timber sales in British Columbia and in the Dominion forest reserves a good beginning has been made in brush disposal, while on Dominion lands under license, in the west, both inside and outside forest reserves, no apparent progress has been made. These licensed lands contain a large percentage of the accessible merchantable timber of the Prairie Provinces, and on them the greater portion of the lumbering operations occur. The cutting on lands included in forest reserves constitutes only a small fraction of the cut on lands held under license.

It is, therefore, of even greater importance that forestry methods be insisted upon in operations on licensed lands, than on lands not included in timber limits. The future productive capacity is being very seriously impaired through lack of proper measures for the regulation of cutting operations on licensed lands.

Similarly, in Eastern Canada, practically nothing has been done in slash disposal, beyond some consideration and discussion, and some small experiments.

It must always be borne in mind, in considering the slash disposal question, that only such measures should be advocated as can be carried out at reasonable cost, and with results, in the direction of reducing the fire hazard, that will be in fair proportion to the cost.

**Permit
System for
Settlers**

Slash-burning operations by settlers are now probably the greatest source of forest fires. Sometimes the settler exercises poor judgment in deciding on the time to set out a fire, or fails to have enough men on hand to prevent its spread; at other times carelessness or recklessness are causative. There seems only too good reason to believe that in some cases, the destruction of the forest by fire is intentional, on the theory that fires facilitate settlement. Fire is necessary in preparing agricultural forest land for cultivation, but means of control is essential to protection of the forest on adjoining lands. The most satisfactory system so far discovered is that of prohibiting the setting out of clearing fires except upon permit issued by a government officer. Reports from British Columbia, Quebec and Nova Scotia, and also a number of the States, show that this system has been successful wherever given a fair trial, and that it is reasonable in cost. The adoption of the permit system in certain portions of Northern Ontario is urgently required. In Quebec, an increase in the organization of the Forest Protection Branch is necessary, to allow of the extension of the permit system outside the territory of the St. Maurice and Lower Ottawa Forest Protective Associations, on the same basis of efficiency as inside, where a sufficient staff has proven the permit system an undoubted success. The close season should also be extended to cover the period between April 1 and November 15. New Brunswick has authorized the permit system in Hazen and Grimmer settlements, Restigouche county, but this requirement should be extended, and with the necessary provision for enforcement.

In Alberta, Saskatchewan and Manitoba provincial legislation is required to regulate settlers' burning operations adjoining forest reserves. It is suggested that the permit system be adopted for a belt extending six miles outside the boundaries of forest reserves. Amendments to Dominion legislation are also required to supplement provincial fire protection legislation.

**New Brunswick
Forest Survey**

The outstanding feature in forestry during the year is the announcement by the Government of New Brunswick that definite steps have been taken toward a forest survey and classification of Crown lands, for which legislative provision was made in 1913. The appointment of a technically trained forester to take charge of the project will shortly be announced. The Crown lands comprise over 10,000 square miles, or approximately one-third the total area of the province. The proposed action is entirely logical, in that the province derives an annual revenue of over half a million dollars from these lands. A



TANK CARS FOR FIGHTING FOREST FIRES; CAPACITY 10,000 GALLONS;
HOSE TO REACH A FIRE 500 FEET FROM TRACK



HEADWATERS OF CHEAKAMUS RIVER
Fine body of timber in British Columbia made accessible by the Pacific Great Eastern Railway



careful stock-taking, together with a thorough and scientific investigation of reproduction and rate of growth, will be required to determine the means necessary for the perpetuation of the forest and of the revenues resulting from its exploitation. The Chief Forester of the Commission has been consulted in connection with the proposed forest survey, and it is hoped that this co-operation may be extended during the coming year, in connection with some of the more technical features of the work in the field.

Railway Fire Protection Good progress has been made during the past year in railway fire protection, which has been handled, as in the past four seasons, under the regulations of the Board of Railway Commissioners. The co-operation of the various Dominion and provincial fire-protective organizations has been given freely, and, with very few exceptions, the railways have also co-operated heartily and effectively.

In forest sections, 686 fires are reported as originating within 300 feet of the lines of railways subject to the Railway Commission's jurisdiction. Of these 43.4 per cent are definitely attributed to railway agencies, 27.8 per cent to known causes other than railways, and 28.8 per cent to unknown causes. Of about 37,263 acres burned over, 33.1 per cent is chargeable against the railways, 20.9 per cent to known causes other than railways, and 46 per cent to unknown causes. The total damage is estimated at \$74,256. Of this, the railways are definitely charged with only 11.2 per cent, while 24.2 per cent is due to known causes other than railways, and 64.6 per cent to unknown causes. We thus have the railways, exclusive of Government lines and a few having provincial charters, directly charged with less than half of the total number of fires reported as having originated within 300 feet of the track; these burned over less than one-third of the total area reported, and did only one-tenth of the total estimated damage, less than \$8,400. These figures show that the railways have been remarkably efficient in extinguishing their own fires, as well as those due to outside causes.

Of all fires reported, the causes were as follows: locomotives, 33.9 per cent; railway employees, 9.5 per cent; tramps, etc., 11.4 per cent; settlers, 12.5 per cent; other known causes, 3.9 per cent; unknown causes, 28.8 per cent. The carelessness of tramps and settlers constitutes a very serious source of fire danger along railways, these two combined accounting for nearly one-fourth of the total number of fires reported.

Disposal of Inflammable Debris	Some progress can be reported in the reduction of fire hazards along railway lines by the disposal of inflammable debris adjacent to railway rights-of-way.
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The work in Algonquin park has been continued, under co-operation between the Grand Trunk railway and the Department of Lands, Forests and Mines of Ontario. This means much better fire protection in Algonquin park, which will be appreciated by the general public.

In Rocky Mountains park, Alberta, the Dominion Parks Branch has used a large number of interned alien enemies in disposing of inflammable debris along the Canadian Pacific railway and the new automobile highway under construction between Banff and lake Louise.

In Ontario, J. R. Booth has disposed of inflammable debris at certain points on his limits along the Canadian Northern railway, east of North Bay, for the specific purpose of reducing the fire danger to standing timber. It is to be hoped that the example will be followed by other limit-holders.

In Quebec, the Provincial Government is considering legislation under which the holders of timber limits adjacent to railway lines may be required to dispose of inflammable debris on a narrow strip next the right-of-way. The influence of the Commission should be exerted in favour of this proposition. The action proposed should, however, be extended to cover privately-owned lands as well.

Fire Protection on Government Railways	Fire protection on Government railways has improved somewhat, but, on the whole, it still lacks much of the effectiveness of the larger private railway systems.
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In New Brunswick, a satisfactory co-operative patrol has been arranged between the Government railways and the provincial authorities, covering portions of the Transcontinental and International railways. In other provinces, while some progress has been made, the action lacks the consistency of that taken in New Brunswick. In Quebec, for example, the officials of the St. Maurice Forest Protective Association have not yet found it possible to reach an understanding with the Government Railways management, for co-operative handling of the patrol along the Transcontinental railway where it traverses the association's territory. As a result, the cost of patrol has necessarily been borne by the association, although in New Brunswick the cost has been shared; on the Transcontinental, in Manitoba, east of Winnipeg, the patrol has been maintained altogether by the Government railways. This situation is inconsistent with that on privately-owned lines subject to the Board of Railway Commissioners, where the entire cost of patrol is borne by the railways,

the various governmental agencies furnishing only the inspection.

The right-of-way situation has shown some improvement, but much remains to be done along the Transcontinental and International railways before right-of-way conditions will approximate the Government standard for private lines.

Along the Hudson Bay railway, now under construction in Manitoba, almost the worst possible conditions, from the point of view of fire prevention, have existed. Fire protective appliances on the construction locomotives have been either lacking or frequently out of order. Neither the contractors nor the labourers have any direct interest in preventing fires, and enforcement of the provisions of the contract covering the prevention and extinguishing of fires by them have been altogether lacking. As a result, probably not less than half a million acres of land adjacent to the Hudson Bay railway were burned over during 1915, causing a material loss in timber and in fur-bearing animals. There is, however, reason for hope that this situation will be materially improved during 1916.

**Forest
Protection
Report**

The report on forest protection in Canada for 1913 and 1914 has been published. This report contains much material bearing on the general forestry and fire protection situation throughout Canada, also special reports prepared by J. H. White and Dr. C. D. Howe, as a result of field studies made for the Commission during the seasons of 1913 and 1914. It is proposed that the plan of issuing forest protection reports biennially be continued, supplemented by publication of special reports where circumstances warrant.

**Inventory
of Forest
Resources**

Continued progress has been made in the inventory of forest resources of British Columbia and Saskatchewan, and both projects are nearing completion.

It is expected that the field work will be completed by spring, and the reports by July 1.

The work in British Columbia has been in charge of Dr. H. N. Whitford and R. D. Craig since the commencement in 1913. A large percentage of the accessible merchantable timber is held under license, lease, or other form of disposal, and most of it has been cruised once or more by the present or former owners. The plan of circularizing limit-holders and other timber-owners has met with very gratifying success. As a result, cruisers' reports have been secured on approximately 70 per cent of the alienated lands, and it is expected this figure will be increased to 80 per cent by spring. The various cruises are checked against each other, and, to a limited extent, by personal observation. In addition, rough estimates of large areas have been made by the Provincial Forest Branch, and, in the Railway Belt,

by the Dominion Forestry Branch, all of which information, together with reports of cruises made by the Canadian Pacific railway, has been made freely available for our purposes. Timber-owners have evinced keen interest in the investigation, and appreciate the value of accurate information regarding the forest resources of the province. The total cost of the investigation to the Commission, exclusive of publication, will be approximately five cents per square mile, for the 375,000 square miles of the province. The collection of this information at such low cost has been made possible only by the large amount of detailed information, secured at great expense by the British Columbia Forest Service, and by the Dominion Forestry Branch.

The work in Saskatchewan was also started in 1913, under J. C. Blumer. In previous years the more accessible forest regions were covered, and much information was secured from limit-holders and the Dominion Forestry Branch. During the past year, the investigation was extended into the far north, from whence relatively little specific information was available, and Mr. Blumer had to depend largely upon his own observations, supplemented, to a certain extent, by interviews with forest rangers, traders, trappers, missionaries, timbermen, and local residents.

Information has been collected to date on about 120,000 square miles, at a cost of approximately three cents per square mile. It has been definitely shown that Saskatchewan's forest belt contains only a relatively small amount of large timber, but a large quantity of small timber. Fires have done enormous damage; they have reduced the stand to a fraction of what it has been and should be, and will again be, if the great difficulties incident to establishing an effective system of fire protection can be overcome. The total amount of spruce saw timber north of the Churchill river, it appears, will not exceed 100,000,000 feet, making the total for the province about 3,000 million feet, a somewhat smaller figure than seemed probable a year ago. The vast amount of young growth renders it of the utmost importance that a much better system of fire protection be provided than has ever been possible under existing conditions of limited funds and the appointment of fire-rangers under the patronage system.

MR. LEAVITT: A part of the discussion contained in the report of the Committee on Forests would perhaps be of interest in connection with the discussion this morning as to whether logging slash constitutes a fire hazard. I think the real difference of opinion was the rapidity of decay, rather than as to whether slash constitutes a

fire hazard. Senator Edwards argued that in the Ottawa region, the slash decayed very rapidly so that only for a short time is it a serious fire hazard. In certain sections of Canada, many years are required for this to occur. Certainly there is great variation in the time required for brush to decay, and much depends on the closeness of utilization of the material. Where it is used far up in the top, as in pulp wood, there is no question but that the brush will decay more rapidly than on a logging operation.

MR. ELLWOOD WILSON: This question of slash disposal is one of the most important questions with which people interested in fire protection will have to deal. Senator Edwards has said that the slash was not properly the cause of forest fires. That is, of course, quite true, because the slash itself cannot start a fire; but it is also certain, from our reports, extending over the last four years, that in the province of Quebec, at least, the only fires which did serious damage were those that ran in lumbered areas where the ground was covered with slash. Fires that start in the natural forest, where the only stuff on the ground is perhaps rotten logs and branches which have fallen down from trees, and which are in close contact with the ground, are easy to handle; they very often go out by themselves, and we have little trouble with them. But a fire which starts in a logging slash is practically impossible to handle without a large number of men and at great expense. In addition, such fires leave the woods in almost irreparable condition, the soil burned off, the standing timber killed, and the layer of humus so injured that it is years before there is any reproduction. The company with which I am connected, has, for three years, carried on experiments in top lopping which, it was hoped, would be a palliation of this difficulty. We find, on experiment with old fashioned logging slash, that, where the trees are taken down to only seven or eight inches in diameter at the top, the debris continues in inflammable condition up to twelve years. Eight years is very common for the slash to remain inflammable. Our experience in top-logging shows that, for the first year or two, the danger is perhaps a little increased, because the debris is on the ground, but by coming in contact with the earth, these branches rot more rapidly, and the probability is that, judging from what I have seen, after about five years the hazard is practically over. But it is necessary to find some way of disposing of this slash. It is an added expense, but one that must be met, and the sooner we are able to get concerted action on this proposition the sooner will we decrease our loss from fire, the difficulties of fighting fire and the extra hazard. As I said, I think we ought to make slash disposal obligatory on all lumbermen, certainly on all licensed land. The Government has a right to protect

these lands for future generations, and it is not right for a man to cut the timber and leave the ground in such a condition that it will burn up and not produce a second crop. We have been told that lumbering at present will not stand the added burden. Neither will lumbermen be able to carry on their operations much longer at the same price if we keep on burning up our forests. It is an absolute fact that in Quebec the timber is getting so far away from the rivers and means of transportation that, in a few years, increasing costs will force reorganization of the industry. We can help this situation only by some rational and reasonable method of slash disposal.

MR. SNOWBALL: Do you believe in burning the slash as a means of disposal rather than in the lopping off of the tops so as to let it down, provided the top is taken off at five inches?

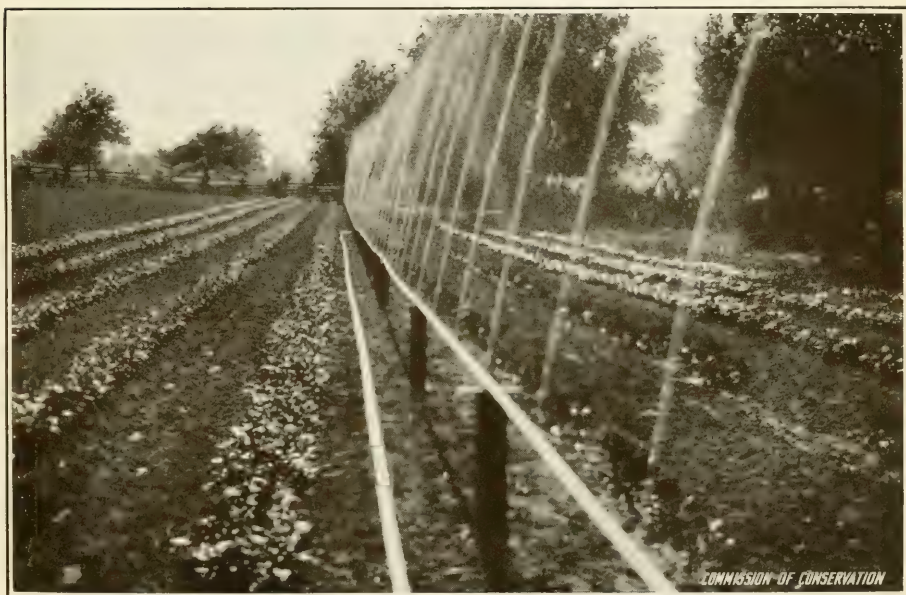
MR. WILSON: The only efficient means of slash disposal, the only economical means, is to burn the slash as fast as you cut the trees down. Let the men who cut the trees pile the branches and burn them. The expense of top-logging is 35 cents a thousand feet, and it would be better to spend that money in addition because it does not reduce the hazard.

The additional cost of burning slash depends on conditions. Experiments are being undertaken along these lines, and in Saskatchewan it has been found I think, that the cost is about 40 cents a thousand feet; but then you have absolute protection against future fires, whereas in top-logging it is only temporary.

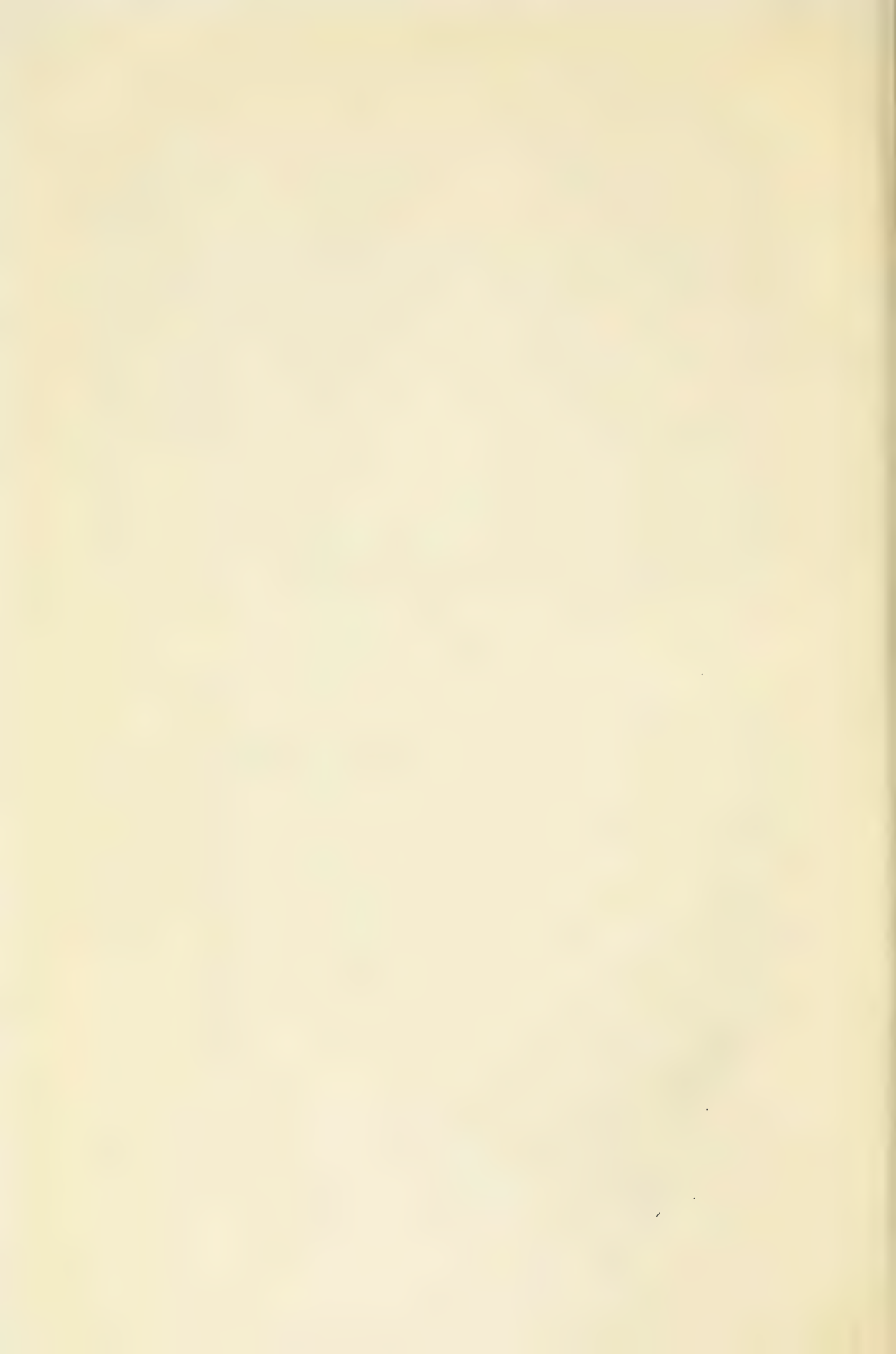
MR. SNOWBALL: In an ordinary lumbering operation, it might be expensive to carry the slash from where the tree is cut down to a place where it would be safe to burn it. In the New Brunswick woods that system would be very expensive. I do not know if Mr. Wilson's territory differs from that where we cut, that is, where he can cut down twenty trees in a bunch, we can only cut two or three out of a clump, and then we have to move on and cut elsewhere, felling to the best advantage to keep clear of standing trees. I have an idea that top-logging is more beneficial than burning slash. I have explained before, and I think that lumbermen in our part of the province will confirm what I have said, that brush which reaches the ground, if properly top-lopped, will hold the moisture for a long period, and, during the dry time in May, when the fires occur, you have so much moisture in the slash that a fire has not as much chance to spread as where you have burned over the ground and the fire is left to run over a dry-topped ground. There is the further fact that the moisture is beneficial to the growth. There are arguments on both sides, but that is the position we have taken. We feel that if



FOREST SERVICE PLANTATION OF WHITE PINE AND SCOTCH PINE, MADE IN 1911,
ON SAND DUNES NEAR LACHUTE, QUE.



PROVINCIAL FOREST NURSERY AT ST. WILLIAMS, NORFOLK COUNTY, ONT.
Furnishes small ash, poplar and hard wood maple trees for farm planting



you cut down the top to five inches and lop the balance you limit the danger of fire from brush; but if you leave the top, and let it stand and dry, it makes a menace that the Government should insist on being removed.

DR. FERNOW: As I was the first to suggest this top-logging, perhaps I may be permitted to refer to it. Several years ago, I proposed this method, but it was prescribed for a definite situation, and, I think, from the discussion, it will be found that different conditions require different treatment. In some conditions burning would be preferable while in others lopping is the only practical method. In New Brunswick, where there is a mixed forest, and only two or three trees can be cut out of a clump, perhaps lopping would be satisfactory. Where you have a dense growth, such as Mr. Wilson has to manage, burning is the only practical method.

MR. MCCOOL: With regard to burning, it would not be possible to burn the slash during the course of operations. You could do that after the first of November, but usually the lumbermen go into the woods the latter part of August or the first part of September, sometimes early in August. To make a fire anywhere in the woods at that time would be a most hazardous undertaking. The cure would be worse than the disease. Water would be scarce, it would be almost impossible to put out a fire, and you could not have men sufficiently well trained in the care of it to protect the standing timber. In fact, more fires would be started in trying to burn the slash at that time of the year than at the present time. I agree with Senator Edwards in regard to the condition of branches. Where they are cut and piled, as they usually are, away from the trees they rot in a very short time; if not, they hold moisture for a long time, and it would be hard to burn them. I had a little experience this summer in trying to make a bon-fire of red pine branches lopped off a year ago, and I found I had to use a lot of coal oil to burn them. I could not burn them even in the pile.

MR. LEAVITT: I think Mr. Wilson also would agree that it is undesirable to set fire to brush before the snow comes. In sections of the country where these requirements are in effect, the procedure would be that, until the first snow comes in the fall, the brush would be merely piled; then, as soon as the snow comes, to any extent, so the fire could not run, these piles would be burned. While the snow is on the ground a little fire of dry wood should be started near the place where trees were to be cut. Since the men have to handle the branches anyway they could be thrown on this fire and thus they would get rid of nearly all the brush. As a matter of practice, in a

number of places they actually get rid of their brush in this way, at slight additional cost, and there is no question as to its decreasing the fire hazard. The United States Government, in connection with timber sales work, makes a practice of requiring some form of brush disposal and a number of States are making requirements to that effect; that is one of the forms which is followed in a great many cases.

For burning, it would be necessary to select a small open space; it need not be very large in winter, on account of the snow on the ground. In the winter, placing the fire at a very short distance from the trees would prevent their being injured unless the piles should be too large.

We find no serious difficulty in getting the brush piles to burn. I have seen cases where operators were a little slow in starting brush burning and had had quite a snowfall; but, if the piles are dry on the bottom and the fire is well started, the snow quickly melts and the brush burns without difficulty. If lumbermen would try this I think they would be surprised to find how easy it is.

THE CHAIRMAN (Dr. Robertson): We should congratulate the Committee on Forests on decided progress. Doubtless there will be differences of opinion regarding how to manage certain particular cases under certain particular circumstances, but you will notice all through the report a distinct note of satisfaction and progress in preventing waste from fire and improved conditions against fire. As knowledge and experience grow the Committee on Forests will make more rapid progress, until we entirely eliminate this unnecessary waste.

We shall now have an address on Bird Reservations, by Dr. T. Gilbert Pearson, of New York, Secretary of the National Association of Audubon Societies and I can say to him, in your name, that we are glad to welcome any citizen from the United States who has a common interest in these common problems. At each of our annual meetings we have had one or more papers from some noted citizen of that country, and I think they have enriched our volumes and added to the interest of our meetings as much as any gentleman who has come before us. I am quite sure that Dr. Pearson will have the usual welcome we give to men who are interested in such things as are for the public welfare.

Bird Reservations

BY

DR. T. GILBERT PEARSON

Secretary, National Association of Audubon Societies

PRESENT operations in the United States, in the line of bird-reservations, grew out of the distinct need of preserving certain classes of birds from becoming extinct. We recognize in North America 1,200 varieties of wild birds. The birds that we may distinctly call farm-land birds, such as the native sparrows, the warblers, wrens, orioles, and many other common insectivorous birds, have, despite the contrary claims of calamity howlers, enormously increased in America since the advent of white man. There has, however, been a decrease in the case of certain forest birds. In the open land there have been more plants, more insect-life, more grass and weed seeds, more berry-producing plants, that spring up along the fences and elsewhere to afford an abundant food-supply. As a result birds of that class have increased and we are in no danger of losing that part of our bird-population. As a result of the increased number of insects it is desirable, however, to have an increase of many species of birds, and a great deal has been done, through a general awakening of public interest to the use of feeding devices, nesting boxes, and keeping down the enemies of the birds, to encourage their propagation.

It is chiefly the birds that could be commercialized, either for their flesh, or their feathers, that have suffered great diminution in numbers in North America as a result of man's activities. An important effort to preserve this class of birds is now being carried on in the United States by the establishment of bird-reservations.

Reservation work began in 1902, under the National Association of Audubon Societies for the study and protection of wild birds and animals. This is the best known and most liberally financed bird-protective organization in the world, and we have been in active operation since 1902. A bill making it a misdemeanor to kill a bird destructive to insects or noxious weed-seeds was pushed by the Audubon workers, and has now been enacted in all of the states except Maryland and six or seven of the Rocky Mountain states.

**Protection of
the Pelican**

One of the states that early adopted this bill was Florida. On the Atlantic coast of that state, in Indian river, there is an island of about four acres, where two thousand brown pelicans have been coming, from time whereof the memory of man runneth not to the contrary, to lay their eggs and rear their young. About the time this law was enacted long quills became very popular in the millinery trade. We found that millinery stores in the large cities were selling feathers taken from the bush turkey, the albatross, the brown pelican, and also from the old turkey buzzard of the south. A gentleman in the Florida Legislature arose and suggested the repeal of this law. He said it was ridiculous, that it protected the pelican, which fed on fish. Evidently he was not aware that these pelicans were feeding almost entirely upon menhaden, which is not usually esteemed as food. Furthermore, he said, the quills were worth two dollars a bird in New York markets, which made \$4,000 worth of feathers on this island, and we had quite a fight to keep the Legislature from being stampeded.

Then, as men might raid a bird colony, the question arose: Would it be possible to get the United States Government to take hold of that island in some way? In Florida there are two Federal courts. A man who kills a bird would rather be haled before a local magistrate, where the jury probably would be composed of friends and neighbours, who had killed birds themselves. In such a case it was a simple matter to leave the plough for a day and stand trial. But in a Federal court it is a different matter. A man may have to travel half way across the state to attend the court, he must appear before men who are strangers to him; and so it comes about that in the southern country men do not care to be haled into a Federal court.

**First Bird
Sanctuary
Established**

There did not seem to be any way whereby this federal control could be secured until the matter was finally taken up with the President. The President said in substance, "Is there any precedent for this sort of thing, or any law? What is the island good for, can you raise anything on it?" He was told, "No, one cannot raise corn, peanuts, razor-backed hogs, or, in fact, anything, on this island but pelicans, and there appears to be no specific law or precedent for the Government to create it as a bird reservation." Then he said, "If the land office will recommend that this land is not good for agricultural purposes we will make it a bird-reserve under the care of the Department of Agriculture, provided the Audubon Society will agree to hire a man to act as guardian on the island."

That suited us exactly. The chief clerk in the U.S. Land Office, Mr. Bond, is an Audubonian of long standing. In a very short time

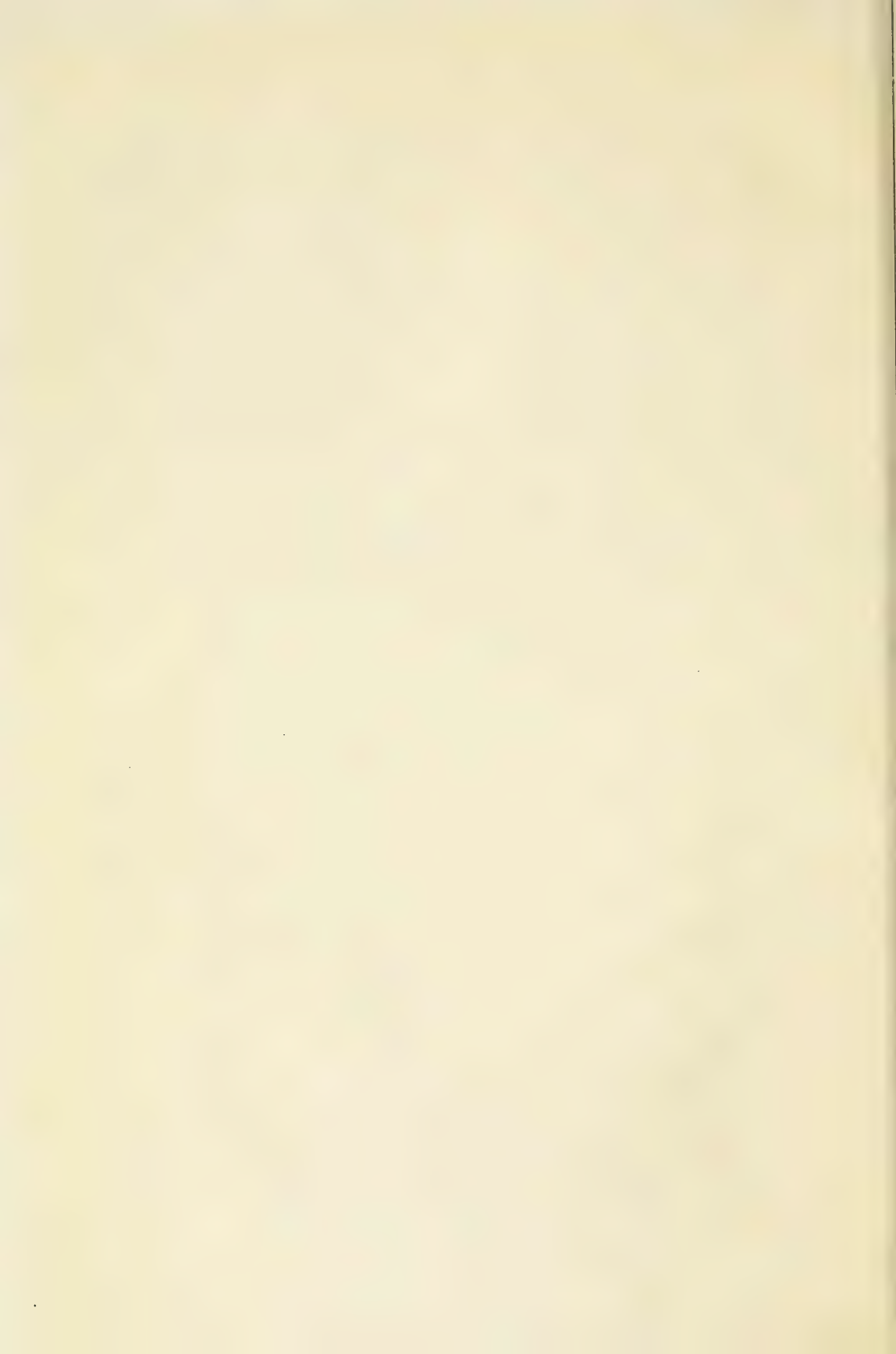


WHITE PELICANS—MALHEUR LAKE BIRD RESERVATION, OREGON



AMERICAN EGRET AND NEST

Showing bird with plumage spread. Audubon Society reservation, Orange Lake, Florida



the matter was arranged, and the President declared the island a bird-sanctuary in perpetuity—a breeding place for wild birds for all time. He took a short cut in doing this, as in the case of the Panama canal, and we had a federal bird-reservation. Along the coast of Florida were found nine other small islands suitable for this purpose, and Mr. Roosevelt made them all federal bird-reserves. Then we were jubilant and had a good deal to say in the press; but, strange as it may seem, certain gentlemen did not approve of the action of President Roosevelt, claiming he exceeded his powers. To overcome this a bill was prepared giving him the necessary authority, and Congress enacted it into law.

Sanctuaries for
Water-Birds
in the West

Later we began to make enquiry about places suitable for sanctuaries for other birds, to find breeding places for water-birds, for, bear in mind, many large birds over extended areas were threatened with extirpation to supply the demand for the market. Sea gulls along the coast, and terns, grebes and others in the west, were in imminent danger from this cause. So the National Association of Audubon Societies began to look for breeding places of ducks and other birds in the west. We examined the western coast and many more bird reservations were the result. When President Roosevelt went out of office, we had thirty-eight bird reserves. President Taft took an interest in the subject and also segregated quite a number. One of the largest of these bird-sanctuaries is the delta of the Yukon, which is as large as the state of Connecticut.

Reserves in
the Islands of
the Pacific

One bird-reserve was created in the western group of the Hawaiian islands, including the Laysan island. This, by the way, was raided the past summer by the Japanese feather-hunters. The Pribilof islands were also made a reserve, as well as the Aleutian chain. We have about seventy bird-reserves in all. For six years the government made no appropriation to protect and guard these birds. Therefore, it become our pleasant duty to ask for money from the members and friends of the Audubon Society willing to give money for an idea—people willing to give money to protect egrets in Florida, or cormorants and gulls on the Three-arch rock in Oregon, all so far away that they could never hope to see them. After the lapse of six years, the government made a small grant for the purpose, although, to-day, the Audubon Society owns and operates the launches on the government reserves, and still helps to pay the salaries of a few of the wardens. The government is appropriating more money each year to this work, and the gentlemen of the Biological Survey who have the work

in charge are exercising every means at their command to successfully protect the birds.

Panama Canal Zone a Bird-Reserve Before President Taft went out of office we took up with him the question of making the Panama Canal zone a bird-reserve. The request reached him, I believe, the day after election—and he took no action. But President Wilson made the canal zone a reserve when he came in. That is a very important sanctuary, as many of our birds go there in the winter. We have many bird-reserves which we are trying to protect that are not on government territory. These are cared for by agents employed by the National Association of Audubon Societies. The islands along the coast of Maine are great breeding places for sea-fowl of various kinds. There are forty-two islands where they nest, and we have sixteen men in service there in summer. We have wardens guarding islands along the coasts of Connecticut, New York, New Jersey, and North Carolina; also in Florida and Louisiana. About sixty important colonies of water-birds are protected by the Audubon Society in the southern states. We have not ownership of all these places. Some we have been able to buy and a few we lease. In other cases we obtained the consent of the owners to protect them. The result is that certain water-birds on the Atlantic coast, such as the herring gull and several species of terns, have come back in great numbers.

Protecting the Egret We are trying to guard the egrets in the south and we know of about ten thousand or twelve thousand of these birds left in the United States. Two of our agents, while on guard, have been shot and killed by plume-hunters, and the colonies have been raided and the plumes sent to New York.

In North America the great nursery for wild ducks and geese is the region between the Great lakes and Hudson bay on the east and the Rocky mountains on the west. We have three great flights of ducks and geese in autumn from that section of the country. Those heading for the Atlantic seaboard chiefly cross the States diagonally, reaching the Atlantic coast about Maryland. In a reactionary migratory movement, many of them go back along the coast at least to Long island and swim back and forth, according to weather conditions. The other end of this movement goes down the coast. There is also the great flight down the Mississippi valley. Under the migratory bird laws, the Mississippi, between Memphis and St. Paul, is a reservation. In the sunken ground of Arkansas we have two large bird-reserves, and on one of these many ducks find

a refuge. This was a famous place for market hunters in days gone by. More than 300,000 ducks were taken there in one year. Another large series of bird-reservations is situated in the state of Louisiana. These include 234,000 acres of marsh-land, where numbers of ducks and geese now find a safe refuge. These reservations were made by the private purchase of Charles Willis Ward, E. A. McIlhenny, Mrs. Russell Sage and the Rockefeller Foundation.

Birds being So we are making some headway. It is a matter in
Driven which those of us who are actively engaged are
Further North naturally greatly interested, and we are very anxious
to see the work extended to Canada. Sloughs in your Northwest
are being drained and the wild water-fowl are being driven farther
north. Alaska will, perhaps, be the last refuge for some of these.
We became so apprehensive of the situation there that we under-
took to call the attention of the people of Alaska to the value of
their bird-life. The Association sent two men to gather information
on the birds of Alaska and collated from publications such material as
was available. Then we published the combined data in illustrated
book form, and last winter sent a copy of the *Alaskan Bird-Life*
to every school-child in Alaska—eight thousand copies in all. As
the children would take the books home, it was thus distributed
to the people. But let us not drive all the nesting birds out of
Canada. You have an immense wealth here yet, and I appeal to
you, as a man from the United States, interested in bird-protection,
to take up the work, for it is quite worth while. If we are going to
conserve the wild water-fowl, which is a great national asset to both
nations, we must have co-operation and must work together.

DR. JONES: I wish to express the pleasure of every member of the Commission with respect to this admirable address by Dr. Pearson. I am sure I express the feelings of every member of the Committee on Fisheries, Game and Fur-bearing Animals, which has this matter particularly under its charge, when I say that everything the committee can possibly do to facilitate the efforts of these gentlemen towards bird-protection will be done. Of course, this can only be done in an advisory way, but we all have the matter very much at heart and will be glad to do anything we possibly can. It occurred to me that possibly Dr. Pearson has not said as much as he might about what he would like to have us do. That is, he has offered very few suggestions as to what might be done in Canada, and how we might supplement the efforts of the people who are doing such good work in the United States. Perhaps he felt a little diffident, that he might be accused of trying to instruct us; but I am sure we

are very much open to instruction along that line, and if he has any suggestion as to what he should like done I think the Commission would be very glad to have it.

DR. PEARSON: After such an opening I cannot help but say one or two things that are in my mind. You have an opportunity in Canada to set aside as bird-reserves very important areas for harbouring wild ducks and geese that cannot be of any great agricultural value. In establishing bird-reservations we have found in the United States it is necessary to bear in mind that people are more important than birds, and, if we set aside land for birds that people can really use for agricultural purposes, it sometimes becomes necessary later to relinquish such areas. But you have many lakes and sloughs in the west that could easily be created bird-reservations without interfering with the agricultural interests of the Dominion. The expense of guarding such territories need not be great. Very frequently some person who resides in the immediate neighbourhood can be secured to give adequate protection. We have found that a little protection goes a long way, that it is perfectly astonishing how kindly and quickly birds respond to protection, how soon they discover the areas in which they are immune from human attack, and how quickly the breeding birds will increase in number. I feel that the most important feature that Canada can take up in the matter of wild life protection is the guarding of wild ducks, geese and shore-birds. I shall be very glad to go into details on the matter of ways and means should the Commission later desire to have me do so.

We would, I suppose, all agree that the general education of the public in any desired line of reform is the surest way to get lasting results in the long run. The National Association of Audubon Societies has long worked on this principle. For the past few years we have engaged in a systematic work of organizing the school-children into classes for bird-study and bird-protection. The children each pay a fee of 10 cents and receive material which costs us much more than that to publish and place in their hands. This consists of a series of excellent coloured pictures of birds, together with outline drawings which the children, by means of water-colours or crayons, can fill in and thus fasten in their minds the correct colouring of various birds. The children also receive a very pretty bird-button bearing the words "Audubon Society." To the teacher who forms a class of ten or more, and sends in their fees to the New York office, there is forwarded, without cost, a year's subscription to the magazine *Bird-Lore* and other printed instructions on the subject of bird-



BROWN PELICANS ON U.S. GOVERNMENT RESERVATION, PELICAN ISLAND, FLORIDA



CALIFORNIA MURRES—TYPICAL NESTING PLACE ON THREE-ARCH ROCKS
FEDERAL RESERVATION, OREGON

study. During the past year about 150,000 children were organized into classes of this kind in the United States.

Representing the Association, I am very glad to offer to extend this opportunity to the children of Canada, and shall be very glad if the Commission of Conservation should feel like co-operating by assisting in bringing this matter to the attention of the various school authorities.

As a further indication that there is nothing of a commercial character about this proposition, I may add that this work last year cost us at the rate of 26 cents for each child enrolled. For the present school-year we have at our disposal a fund of \$26,000 to use in this work, and I shall be very happy to share the advantages of the plan with the children of Canada.

DR. BRYCE: I think one of the best things we could do in Canada would be to establish Audubon Societies. We have one in Winnipeg, and we are there in the line of flight. It is an interesting subject, and the newspapers have taken it up and have bird departments. But I think we should, as a Commission, take a wide view, and, having the Dominion Government behind us, we might be able to have reservations made. I can assure you that during the last four or five years there has been an enormous increase in the number of birds in the Northwest, and I believe this country is ready for a movement of this kind.

THE CHAIRMAN (Dr. Robertson): I am sure we have all been delighted by Dr. Pearson's treatment of this subject, and his vivid description of what his organization has been able to do. As very small children we get great happiness from looking at birds. I think I should cite one Canadian, Mr. Jack Miner, of Kingsville, Ontario, who, having invited wild geese to pay him visits, when going and coming, now has visits from many hundreds in the autumn and spring; and, while he has made some money from his brick yard and lands, he has made far more happiness for himself and the locality from his hospitality to the birds. I do not know that I ever got more pleasure than from a visit to his place.

Co-operation in the Fishing Industry

BY

N. S. CORNELL

*President, Producers' Fish Company,
Port Stanley, Ont.*

IN 1912, as commercial fishermen, we formed what is known as The Producers' Fish Co., the first association of fishermen that ever successfully tried to break the Booth combination. Perhaps, as you are not commercial fishermen, you do not appreciate what that is. The Booth Co., as buyers of fish, control the markets of America. There are just two markets for fish, outside of local markets, Booth's and the commission trade in New York. The Producers' Fish Co. was capitalized at \$20,000 and each of twelve tugs took one share at \$100. With that \$1,200 we have become successfully established—of course it was applied in a judicious manner. We bound ourselves, under a penalty clause, that any one breaking away from our company would pay a forfeit of \$500. But for the forfeit clause we could not have held our members together. Two of our men broke loose and had to be restrained by injunction—and to-day there are no more thankful men in the world than they.

Conditions	In 1912, when we would have an ordinary catch of
Before	two or three tons of fish to a boat, representatives
Organization	of different firms would bid for them, and we would

get three, four and five cents a pound for our fish. When the big run came on, when the catch came up to eight or ten tons to a boat, for, as in the halibut industry, we get more fish at some times than at others, these men would sit back and the combine's agent would come. He would say: "Well, boys, we do not know what we are going to do for you; they are catching any quantity of fish on the other shore, and we do not want your fish at all." Then he would let the matter stand in that way. Fish are perishable. Most of the men engaged in fishing are not business men. They saw the loss of those fish staring them in the face. The agents would select the weakest man, and say to him: "Captain, we can take your fish." Then this man would say: "What will you give me?" The agent would say: "One and one-half cents a pound, but do not tell that to the rest of the boys." Imagine catching fish for \$30 a ton! That was the price that some of our men got before we formed our company. The first year we

operated, 1912, our prices during the big run were three cents a pound. We just doubled the price that year, and in 1914 and 1915, it has been five cents a pound. On the other hand the commission markets of New York can only consume a certain quantity of fish; and, frequently, 200 boxes of fish will bring more on the New York market than 1,000 boxes at other times. It would pay fishermen better to bury 800 boxes and ship 200. However, by co-operation we do not have to do that. We know the quantity of fish the New York market is capable of handling and only send that quantity; just sufficient to keep them hungry. The other 800 boxes we divert to different markets, or, if there is no market, we put them in freezers for future sales.

**No Increase
in Prices**

Do not think that this is a combination whereby the price of fish is increased to the consumer. At the very time when we had to sell those fish at from one cent to one and one-half cents a pound, the price you paid was exactly the same as when we were getting five cents a pound. We were simply "held up" by these people, but we have now fought the matter through. That is just one of the benefits of co-operation in the fishing industry.

**Fertilizer
Plant Operated**

When we were working in the ordinary way, the Government compelled us to haul away and bury any offal or unmarketable fish we brought ashore, such as eel, pouts, etc. You know it is easier to throw anything of that kind overboard than to bring it ashore and draw it away. There was never any inspector there. Of course it was to our interest that the bottom of the lake should be kept clean, but we could never impress this on all of the fishermen. Just as some of the previous speakers have said in reference to fire protection, it is essential that you should bring a thing of this kind down to an individual basis. We conceived the idea of starting a fertilizer plant, and we have now one of the most successful fertilizer plants in Canada. I think, perhaps, the only one that is operated for offal fish in America. It has been very successful. It has paid about 15 per cent, and keeps the bottom of the lake on our fishing grounds clean—and that was the object in the first place.

**Co-operative
Action Secures
Consideration**

Another benefit of co-operation is in connection with the propagation of the fish. We, as commercial fishermen, were never consulted by the Government.

They got their inspiration largely from the Anglers' Association. But when our organization became of such importance that we represented twenty tugs, each one employing ten men, a total of two hundred men—well, there were two hundred votes. Perhaps I should not talk this way, but I cannot express myself in

any other, and I do not mean more in reference to one political party than another. Now when we go to the Government for anything we say: "We represent The Producers' Fish Co.," and they will sit up and look at us and say: "That is all right, what do you want?" Before, when we would make a statement, they would listen, but would say, in effect, "That is for your personal interest and we think we know more about your business than you do yourself."

**Propagation
and Protection
of Fisheries**

You have heard people talking about close seasons. These are all right in some places, but, in international waters, they are useless. You will be surprised at what I am going to tell you, but I am going to prove it. I assert that a lake properly fished will produce 50 per cent more fish than if it is not fished at all. I have been a lumberman and a farmer, I am now a fisherman, and, when I want to illustrate my point, I use one or other of those callings. Suppose you had 100 acres of land, and you wanted to raise all the cattle that it was possible to produce on that 100 acres. Would you keep the bullocks until they were fourteen years old, or would it not be good business, whenever one of those bullocks was mature, to turn him off? Will that not apply to fish? The lake will produce a certain amount of fish food, just as the 100 acres of land will produce a certain amount of beef food. Is it not an economic fact that, when fish are mature, they had better be taken away and the rest of the food left for the young fish, just as it would be left on the farm for the calves and growing stock? That principle applies doubly to fish, because there is a class of fish we call "pirates." They not only eat the food of the smaller fish but they eat the smaller fish as well. Now the proper and the rational way to deal with these things is to apply common sense. The common sense method would be for the Government to regulate the size of the mesh, especially in gill-net fishing. It could not be done so readily in pound-net fishing. In this way nothing but mature fish would be taken. Then how will you deplete your lake?

**Increase
Number of
Hatcheries**

Then we should use artificial hatcheries. We have in Lake Erie the greatest cisco herring fishery, perhaps, in the world. We take more fish out of lake Erie than out of the other great fresh water lakes together, Michigan, Huron, Ontario and Superior. In 1914, we had in one day from nineteen boats a lift of 243 tons of herring. Of the cisco herring we have almost a monopoly. Another herring we get is called the Jumbo herring; some of these weigh up to six pounds. They are a cross between the whitefish and the herring—notwithstanding Prof. Prince to the contrary. He tells us that is impossible, but we

have done it—we have made the cross. We have put the spawn and the milt in the same jar and have watched the fish hatch, both in Sandwich and under Jerry Driscoll, in Erie, Penna. We know we produce that kind of fish, and in that way. Prof. Prince states that no spawn from whitefish hatch other than those which are deposited in honeycomb rock; also, that one per cent is a fair estimate of the amount of spawn hatched under natural conditions. Under artificial hatching, we produce, in the Erie hatchery, 96 per cent, and in the Sandwich hatchery 84 per cent. Would it not be better for the Government to expend on hatcheries a little of the money which we pay them, so that nearly all of the spawn can be handled, and thereby keep that lake full of fish; then, use common sense in the size of mesh allowed the fishermen, rather than restrict by close seasons, which amount to nothing?

Spawning
Season Varies
in Lakes

The time of spawning is not always the same—it differs in different lakes and localities. The dates that the fish come on the spawning ground demonstrate that. In order to make a successful restriction it would be necessary to have different laws for different lakes, and, even then, it would amount to but very little, as the difference between the natural hatch of one per cent and even the 86 per cent at the Sandwich hatchery is so great. We have furnished the department with every facility for gathering eggs. We once asked them to take the restriction off catching whitefish. At that time, the fishermen of the counties of Elgin and Norfolk were prohibited from catching whitefish during November, while those in the counties of Kent and Haldimand were allowed to fish. We were sandwiched in between and forbidden to fish, so we asked the Minister to remove this injustice. We were advised that there was an understanding between the United States and Canada under which there could be no change until a uniform basis was decided upon. The injustice complained of was not removed that year, as it was expected the Commission having the matter in hand would arrive at an early decision. However, the next year it was just the same.

We interviewed the Government about opening more hatcheries, and were told: "What is the use of more hatcheries, when we cannot get sufficient spawn for the hatchery we already have." They said that the chief source of supply was from the bay of Quinte. We said "Let us catch the spawn for you." So the Government sent three or four men out on our tugs, and, in four days from the time these men set to work, we had a telegram from Sandwich: "Send no more spawn; everything is full." By this means we got the closed season on whitefish removed in the counties of Elgin and Norfolk. This year, we

undertook to get the spawn ourselves, without assistance from the Government, other than to have a man there to ship it and instruct fishermen as to the mode of collecting it. Although the fishermen were inexperienced in spawn collecting, and received no remuneration for doing so, we filled every hatchery available in Canada, and the last shipment was sent to Detroit, as a present to the people on the other side, because we knew the fish would come back into Canadian waters.

**Handicapping
Production** Last year, on account of the war, the Government was impressing upon farmers and others the absolute necessity of producing all food possible. Yet they charged us \$250 for a tug license, they would not allow us to fish until the 15th of March, and then, for the first time, they tried to encourage us by adding another \$5 a ton on all fish we caught over 80 tons. Thus, they encouraged us to produce more. And then they cut us off on the 15th December instead of allowing us to fish until the end of the year.

I do not blame them for this; the trouble was due to lack of co-operation. We were not co-operating sufficiently with the pound-net people to the west of us; they were fighting us. You have heard the story in the old National school books, of the man who tried to please everybody and, in the end, pleased nobody, and lost an interesting animal into the bargain. That has been the position of the Government in regard to these fisheries. But they are now, I think, sufficiently awakened to the errors they have made and no doubt things will be better next year. There will also be further co-operation between the gill-net people and the pound-net people.

**Regulations
Protect
Pirate Fish** Another mistake that has been made for a long time illustrates the want of co-operation. An order was issued by the Minister forbidding the catching of suckers and fish of that kind that go up creeks in the spring. If they were caught by a boy with a net an inspector would jump on him, tear his nets to pieces, and, on conviction, he would be fined; whereas, they should have given him a bonus for every one of these fish he caught. These suckers, and other fish with that peculiar mouth that drops down, occupy the same position to good and commercial fish that the Canada thistle does to a field of wheat. They are spawn eaters, and every one of them will destroy enough spawn to make a ton of fish. Yet the Government, in its wisdom, consulting anglers and people of that kind, and taking inspiration from them, actually prevented the destruction of fish that destroy more commercially valuable fish than all other agencies put together.

Salmon Trout
Destroy Many
Whitefish

Mr. A. Sheriff, Deputy Minister, Game and Fisheries, Toronto, recently stated that the Government was establishing more hatcheries, and requested my opinion respecting the Government hatchery at Southampton.

I told him that, so far as whitefish were concerned, I was never so sorry for anything as to see what was being done at that magnificent and expensive hatchery, because they are propagating salmon trout, a fish of less value, and one which eats enormous quantities of whitefish. A close season is put upon salmon trout to prevent them from being fished out, yet, as in the case of the suckers, a bounty should be paid on every one of these fish caught. May I give another illustration from my farming experience. Suppose mutton was worth ten cents a pound and wolf meat eight cents a pound. Would it be good business to raise wolves and feed them on mutton? That is exactly what is being done in our fish culture, because, while whitefish is worth ten cents a pound, trout is worth from six to eight cents—and one trout will destroy fifty pounds of whitefish. I have said that the proper way to deal with these matters is to apply common sense to them; the example which I have just given shows the injury which the Government officials may do to the really valuable fisheries by attempting to carry on fish culture without consulting those who have practical knowledge of the fisheries.

Silvicultural Problems on Forest Reserves

BY

DR. B. E. FERNOW

Dean, Faculty of Forestry, University of Toronto

IN recent years so much stress has been laid upon the subject of fire protection that some of our people may have perhaps come to the conclusion that about all there is to forestry is protection against fire. Undoubtedly, fire protection is the most important thing and should be attended to first. It should, however, be clearly understood that forest protection constitutes only a preliminary essential to the practice of forestry.

Forestry has for its primary object the production of wood crops, hence silviculture, the branch which has this object as its special business, is the key-note of forestry. To remind you of this fact appears like reminding you that the farmer's function is to produce food crops.

It is my purpose to discuss in the simplest manner some technical problems, some of the difficulties which may be encountered when we begin to practise this art of wood production.

Last summer, through the courtesy of the Director of the Dominion Forestry Branch, and in his company, I had the privilege of inspecting conditions in some of the Dominion forest reserves in the Prairie Provinces and of some parts of the Rocky Mountain reserves.

Inspection of Forest Reserves	This inspection was made with a view to enabling me, as chairman of the newly established Advisory Board of the Forestry Branch, to formulate propositions for investigatory work as a basis for an eventual technical management of the reserves.
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While ten weeks' travel, can, to be sure, give only a very superficial insight into conditions and problems, contact with actualities and intercourse with the men in charge permits, at least, a judgment of the general requirements in the administration and management of these properties.

The practical wisdom of inaugurating the forest reserve policy would, I believe, be admitted by anybody on general principles, but any doubts as to the wisdom in each particular case will vanish from him who visits the reservations and secures even only a slight acquaintance with the actual conditions surrounding them. The

conviction will also be strengthened, not only that these reservations should become or remain without question permanent, but that they should be added to; and, also, that they should remain under the control of the Dominion, which can, much better than the provinces, afford to carry the burden of the dead work that must be done to make these properties serve their object, namely, to furnish continuous wood supplies to the surrounding settlements. The visitor will also realize that, to fulfil their function, namely, to furnish wood supplies, a systematic *technical* management is a more or less urgent necessity, and should be inaugurated as early as possible upon the basis of carefully prepared working plans.

Timberland Administration Only Attempted So far, in the minds, not only of the public, but of officials as well, the problem of the forest reserves has appeared of the same nature as that of the mere administration of timberlands; so far, indeed, hardly more than a timberland administration has been attempted, albeit with a somewhat more conservative disposal of available supplies. Of the practice of forestry, the technical art, there is as yet hardly a beginning. For such an administration as has been hitherto attempted technical men and technical knowledge are hardly required. The fact that most reserves are under the management of non-technical men bears out this contention: *Forestry practice therein is still non-existent!*

The application of forestry means efforts to reproduce the harvested crop, efforts to make the reserves continuous producers, and to manage them with a view to sustained yield, as it is technically called, which can be done only by application of silviculture, the art or forest crop reproduction.

Reason for the Absence of Forestry Practice The principal reason for the absence of such forestry practice is probably an economic one. Most of the reserves are located where, as yet, no market or only a limited market exists, and, moreover, the best timber, the marketable portion, on most of the reserves, had been placed in timber limits, which were haggled away before the reserves were created, hence the administration was financially handicapped at the start. In addition, the administrator of the reserve, if he consulted the technical man, would have found out that to reproduce the forest crop costs money, just the same as reproducing the farm crop, and as he is accustomed to deal only with present-day affairs, he is apt to let the future take care of itself, and to confine himself to present-day timber sales of whatever available supplies are at hand. He thinks that if he has made provision against fire danger, and for reduction of waste generally, perhaps restricting the cut to a diameter limit,

he has done all that can be expected. Surely, these administrative measures are of primary importance and need first consideration, but if this were to remain the proper attitude, the reserves would fail of their object, and, altogether, the prosperity of the country would suffer in the future.

**Long Range
Calculations
in Forestry**

The forester also takes into consideration the economic conditions under which he is to practise his technical art; he also is shy at avoidable expenditures, but he makes a long range calculation. His business is to provide for the future, and hence, he looks into and calculates with the future, and he knows, from the experience of other nations, that it requires expenditure and apparently dead work in the present to secure results for the future. His finance calculation is for the long run! In the *Sixth Annual Report* of the Commission of Conservation, I ventured to make such a calculation for the Trent watershed, to show how profitable such expenditures can be made. It may, in this connection, be worth while repeating the experience of France, where, by the expenditure of around \$18,000,000, in planting up 2,400,000 acres of waste land during the last century, properties worth now \$140,000,000 were created.

We must not be deterred by the fact that the forest crop is slow in maturing, that it takes many decades from the seedling to the log tree, and not less than 60 to 120 years for a profitable crop to mature. On the contrary, this is a reason for the timely beginning to start the crop. It is this time element which makes the forestry business unattractive to private enterprise and furnishes the argument for the Government to engage in it, the justification for setting aside forest reserves and for handling them for the sustained yield under systematic forest management. Only a government with the duty to consider a long future, with *providential functions*, can afford to do this.

**Classification
of Reserves**

From the standpoint of the more or less immediate need of inaugurating such systematic forest management, we may classify the reserves into four or five classes.

There are some reserves, located near well populated districts, whose natural supplies are already being heavily drawn upon, such as the Cypress Hills reserves in Alberta and Saskatchewan, the Pines and Nisbet reserves in Saskatchewan, and the Turtle Mountain reserve in Manitoba. In these reserves, there should be immediately inaugurated a well considered felling plan and a judicious reforestation program. Under present methods of mere exploitation the virgin supplies must be soon exhausted, unless adequate provision is made at once for a new crop.

Next, we have reserves which, as yet, are but lightly drawn upon, but which within the next decade promise to come into market more fully, as the settlements come up to their boundaries and the settlers' wood supplies are giving out. Such are the Duck and Riding Mountain reserves in Manitoba. Here, every opportunity for more careful study of the silvicultural problems should be embraced, and a thorough preparation for technical management should be begun now in anticipation of their coming into market soon.

Land Unsited
to Agriculture

Then there are a number of reserves that were not set aside on account of their timber, which was either used up, burned up, or naturally absent, but on account of the unsuitability of the soil for farm purposes and the possibility of using it for timber crops. Such reserves are the Spruce-woods reserve in Manitoba, partly wooded, and the Manitou reserve in Saskatchewan, largely without natural growth, and several other sand-hill territories. Here, planting operations should be begun at once, first by trial plantations with various species and methods, and, after experience has been gained, on a larger scale, with or without assistance, by natural regeneration as the case may be.

Lastly, there are extensive reserves in the northern prairie regions and in the Rocky mountains, which are as yet so far removed from market as to place them last from the standpoint of the need of technical management. Here the problems are still mainly of administrative character: to prevent further deterioration of the properties, especially by fire; to regulate the use of whatever resources may be available, such as pasturage; to improve these resources; to make them accessible, and as far as technical interest is concerned, to study the silvicultural problems against the day when they must be solved.

Systematic
Working Plans
Essential

All reserves, however, once set aside for permanency, should be administered under systematic working plans more or less elaborate, especially with reference to their utilization; and, if they are to do justice, not only to the present, but also to future needs, such plans must eventually provide the application of proper silvicultural methods for securing a continuance of wood crops.

There is no other productive business which requires so much planned and conservative procedure as the business of producing forest crops, for the reason that not only do these crops mature slowly, but there is little chance to advance and improve the crop after it is once started; its proper start, therefore, is the important thing. The manufacturer can change his processes in a few weeks, the farmer from year to year, but the forester, once his crop is started, may not change his procedure for a century, and there is only limited chance

during the life of the crop to interfere with its development; therefore, the necessity of careful planning.

**Condition of
Reserves**

If our reserves were all first-class, useful virgin timber, the working plans would be a simple affair. They would consist in prescribing the cutting of the year's requirements in such a manner as to secure reproduction—a natural regeneration. But this is by no means the condition, even in the well-wooded reserves; only small portions consist of mature, useful timber, largely spruce; large portions, as a result of fires, represent young growth, or are grown up to undesirable or at least less useful species, principally aspen; some of these aspen stands are rotten and useless; some areas are mere brushlands, and still others entirely waste—dilapidated woods which only a laborious building-up process can bring into desirable productive condition, and that means careful planning, and, eventually, the necessity of expenditure in starting future crops.

**Rapid Growth
in Prairie
Regions**

In this connection, there is one feature of importance to which I may refer in passing, that pertains at least to some of the reserves in the prairie regions which is encouraging in this respect, namely, the remarkable rapidity of growth, which excels that of the eastern provinces, and promises early maturing of a valuable crop.

This statement has special reference to the white spruce, which, on the deep soils which it occupies, grows for a long time on the average at a rate of 5 to 6 years to the inch, making a 15-inch tree, 80 feet in height, in 80 years.

In order, then, to inaugurate a systematic management of any property, the character and condition of the property needs to be known in detail; next, its administrative, its economic, and its technical problems must be recognized and solved.

**Detailed
Forest Survey
Required**

These requirements, in a forest property, involve, first of all, a detailed forest survey, including a close stocktaking, and mapping; next, a suitable subdivision into smaller units or compartments for convenient handling; a study of the materials that can be marketed, and not only a study but a stimulation of the market for the minor materials; next, a study of growth conditions and their effect and results in regard to regeneration and increment. Based on this information, an admissible felling budget may be calculated and the felling areas may be suitably located; finally, study and experiment is necessary, to learn how the local silvicultural difficulties may be overcome.

These are the data which must be ascertained in order to formulate a working plan and to inaugurate a technical management. There

is no need here, I hope, to insist on the necessity of employing men with professional training to collect these data and to apply them; no need to insist that permanency of tenure of office and continuity of organization are essential to successful execution of the plans.

I propose now to point out a few illustrations of the kind of silvicultural problems that must eventually be solved by experimentation, those that arise in attempts to secure a new crop of desirable character.

Each reserve has its special problems, according to its character and composition.

The Aspen Problem In the Riding and Duck Mountains reserves we find conditions and problems very much alike. The most valuable species here at present is the white spruce, hence it is this species for which the management would have to be devised, especially as at least sixty per cent of the soil is adapted to this species.

Unfortunately, numerically, another species, the aspen, is most prominent, as a result, undoubtedly, of fires which in past ages and also in modern times have reduced the spruce to only a limited amount; hence the spruce must be re-established in competition with the aspen.

There is no difficulty on this account in the nature of the two species, for the spruce is a tolerant species and can stand the light shade which the aspen gives, almost without being retarded in its growth. The only problem is that of the profitable, or, at least costless, removal of the surplus of aspen.

Aspen has Many Uses Aspen is by no means a useless weed tree. Not only is it valuable as a mere soil cover, recuperating the soil after fires, but it furnishes an acceptable fuel-wood and pulpwood, and even an inferior grade of lumber, especially for flooring. Aspen also lends itself to use for small woodenware, boxes, crates, pails, and excelsior. The establishment of industries near or in the reserves using this material is probably possible, and should be brought about by investigating the possibilities of securing a sufficient supply of the raw material and other factors favoring such industries.

Unfortunately, the aspen is liable at an early age to rot. Large areas of mature aspen, which look as if they would cut satisfactory saw material, are to the extent of fifty to eighty per cent "punky," and, so far as known, useless. The silvicultural problem of re-establishing the spruce must wait upon the solution of the technological problem of finding a use for "punky" wood, or a use where at least a certain per cent of rot is not objectionable.

Such large areas of pure aspen of all ages are found in these and other reserves that it will become an unavoidable necessity to work in part for aspen reproduction, and in that connection to solve the problem of reducing or stopping the progress of the disease, keeping it out of the younger growths that are not yet affected.

The aspen problem is, indeed, a general one throughout the whole of eastern Canada; the development of its profitable utilization should be made one of the studies of the Forest Products Laboratories.

**The Underbrush
Problems**

There is little or no difficulty in establishing spruce under aspen, because of the shade endurance of the latter, but another and worse inimical agency comes in to make difficulty. The light shade of the aspen favors the establishment of a dense underbrush, especially of hazel, with an admixture of half a dozen other shrubs. This underbrush keeps out the spruce, keeps it from establishing itself by natural seeding, and would choke it out if planted; hence it must be removed before a young crop of spruce, or even of aspen, could be established. Experiments are needed to determine the cheapest effective method of dealing with this trouble.

The inquiry would be as to whether cutting or burning produce the more favorable conditions and at what time of the year it is best to do the one or the other.

**Planting
Problems**

The desire of the forester is to secure his crop, if possible, by natural regeneration; that is, to so handle the mature crop that the seeds falling from it establish the new crop before the seed trees are all removed; this, in order, to avoid the outlay for planting. But there are large areas in these reserves on which no old crop of desirable species is to be found, and it becomes necessary to establish such species by planting. The problem, then, is to find the most suitable species and the cheapest successful manner of propagation.

To gain an insight as to what species to introduce, trial plantations on a small scale are indicated.

It is my impression that, not only in the aforementioned forestless reserves, and where desirable species are lacking, but also in the well-wooded ones, planting will often be found preferable to reliance on natural regeneration.

**Artificial
Planting
Favoured**

While the apparent economy, in relying on Nature's ability to establish a new crop, is in favor of natural regeneration, avoiding the cash outlay necessary to start the crop by artificial means, namely, sowing or planting by hand, in the end the latter often proves the cheaper.

To use Nature as a planter requires not only knowledge, judgment and skill, but favourable weather conditions, satisfactory seed production and suitable condition of the ground for germination and growth of the seedlings. This combination of favourable circumstances does not occur frequently. On the other hand, by growing seedlings in nurseries, where they can be given the best care, and setting out plants, success can be forced, and time, especially, can be saved. Hence, early attention should be given to finding out the best materials and methods of planting.

The Jack Pine Problem Large areas of sandy soils are covered with a dense growth of pure jack pine, standing so dense that each tree has little chance for development, hence the individual development is extremely slow. By reducing the number per acre, *i.e.*, by thinning, as it is technically called, the remaining stand can be given opportunity for better development.

The problem is to find out at what time in the life of the stand to thin, and how many trees to the acre promise the most satisfactory result.

The most valuable use of the jack pine is for railroad ties, and it would, therefore, be desirable to grow tie trees. For this purpose, there is no need of freedom from knots, hence branchiness is no objection, and the increase in increment, due to fully developed crowns that can form in open stand, may be secured without injuring quality. That indicates an early and severe opening up, only taking care not to expose the soil too much at a time.

Rapid Early Growth should be Utilized The jack pine is a rapid grower when young, but not persistent, hence this tendency should be utilized by giving it a chance to develop its rapid growth early. This may, perhaps, be done by reducing the number in the stand early to, say, 300 or 400 trees per acre, or perhaps even less.

The narrow-minded manager will object that the operation would not pay, because, perhaps, he could not profitably dispose of the material coming from the thinnings, but if it could be shown that, instead of having to wait 80 to 90 years for a five-tie tree to develop, a full crop of railroad ties, 1,500 to the acre, could be produced in 40 to 50 years, the eventual profitableness of the operation might justify its inauguration, even without the possibility of disposal of the thinnings. Experiments, then, for determining the most satisfactory density of these stands should be undertaken at once.

The possibility of shortening the time of production of sizeable materials by a rational thinning practice has, even in Germany, been fully realized only during the last 30 years, and now, not only are

from 25 to 50 per cent and more of the final harvest crop secured by thinnings, without reducing the amount of the harvest crop, but the rotation, as far as it is designed to produce sizes, can be reduced at least 20 years.

It is then desirable to institute thinning experiments in other than the jack pine stands.

The Muskeg Problem Such experiments at once suggest themselves also for the black spruce stands on the large, peaty muskeg areas in the reserves. These usually grow in overcrowded condition, retarding the development to size of the single individual. Whether the rate of growth can be changed by thinning, could be easily found out. The probability, however, is that lowering the water-table would show better results.

Altogether, the problem of the proper use of these extensive peat bogs is one that should early occupy the attention both of the Forestry Branch and the Agricultural Department, for there is hidden in them a great resource that it has so far not been given to us to fully realize.

The Fallen Timber Problem In the Rocky Mountains reserves fires have killed large areas of mature growth, and, as a result, there are thousands of acres of windfalls, covering the ground with a labyrinth of down trees. These make the areas almost inaccessible and unmanageable for cropping. What can be done with this unfortunate condition? After some time this material rots, disintegrates and becomes a part of the soil, but in the alpine climate this process takes a long time.

Meanwhile, these areas form also dangerous fire traps.

Here again, the Forest Products Laboratories may be able to work out a solution, devising means of utilizing such material.

Altogether, the problem of finding uses for minor wood materials is one the solution of which would often make it economically possible to solve the silvicultural problems.

Many Problems Which Must be Solved There are, then, a host of problems which it takes time to solve. Their solution should be attempted at an early date. This is possible by experiment on a small scale before the necessity of solving them on a large scale arrives. But it should be realized that the answers to these inquiries, by experiment, come almost as slowly as the crop itself for which they are made.

Therefore, the time to inaugurate them is now. Fortunately, the experiments, outside of requiring careful and judicious planning, can be made with very small expense, and considerations of economy, due to the exigencies of the war, need, perhaps, not delay them.

Fur Farming

BY

STANISLAS VALIQUETTE, Nominig, Que.

IN reporting the results of experiments at the raising of wild animals in captivity, I may state that our principal object was the propagation of mink for its fur, but we also intended to experiment with foxes, raccoons, martens, etc. We commenced operations in the summer of 1912, and an outline of our successes and failures is as follows:

In the first place, we constructed fences around our ranch, which measures 100 ft. x 100 ft., divided by inside partitions, as shown on the attached sketch. Contrary to the usual latticed ranches, we constructed a completely closed outer board fence, twelve feet high, in such a way that the animals cannot see outside; we previously had put a wire fence into the ground to the depth of three feet. On the inside face of the board fence we put a wainscot of sheet iron, painted black, to a height of five feet from the top; this was to prevent the animals from climbing over the fence. The inside subdivisions of the ranch were made of joined wire fences with 2-in. links for the foxes and $\frac{3}{4}$ -in. for the minks. In the foxes ranches, we had constructed a box measuring 3 ft. x 4 ft. x 3 ft. in height with an indirect opening. The minks pens were divided in the same way except that the boxes were smaller.

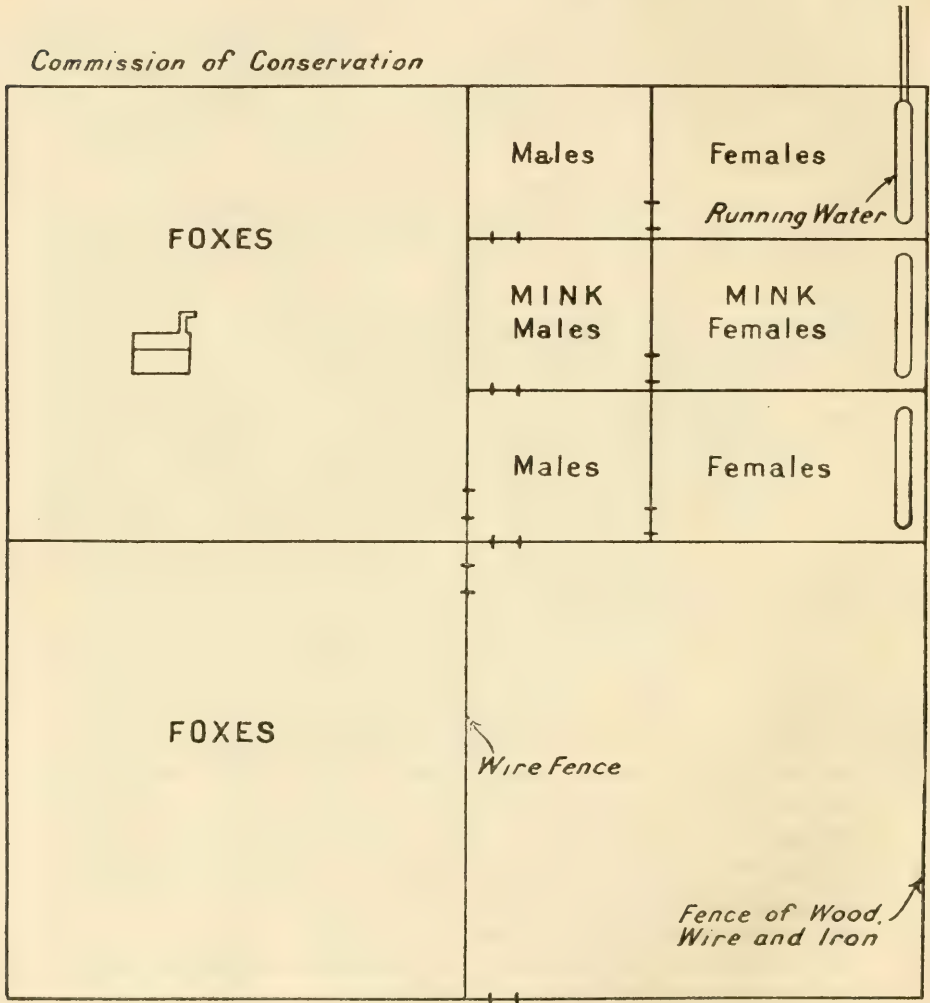
Experiments with Minks

In the autumn of 1912, we had twelve minks in our ranch; divided by couples, as far as possible. The greater number of these had been caught in the neighbourhood by means of wooden boxes like ordinary rat traps. These minks were fed with fresh meat, fish and table refuse, also bread and milk, in pretty large quantity. The results were disastrous, as all died within about six weeks, some apparently of diarrhœa and the others of wounds caused by fighting among themselves. A strange fact is that two minks, separated by a wire fence of $\frac{3}{4}$ -in. mesh, fought each other until they died.

In the summer and autumn of 1913, we again started our experiments, but the results were still unsatisfactory, though better than those of the previous year. We have been able to keep minks for periods varying from one to six months, but have finally lost them. We give them as food meat, strictly fresh fish, bread and milk at

intervals, though in less quantity than formerly; but we still had cases of diarrhœa and other diseases that we have been unable to diagnose. They seemed to fight less. Many times, minks which were evidently sick were cured by giving them only milk for two or three days. We kept minks till the month of February during the winter 1913-14; but they eventually died and were found frozen. During the coldest weather, whenever we noticed that a mink was sick, we were sure to find him frozen the morning after.

Commission of Conservation



High Sandy Situation

Scale: 21 feet = 1 inch

I will mention here a peculiar incident in connection with the mink. In some of our ranches we had put troughs of 3 ft.x 3 ft.x 8 ft. in length, kept full of running water. Frequently, we put in small fish, such as trout, chub, carp and perch; as soon as they were in, the minks were chasing them with extraordinary vivacity, and they never stopped till the last fish was caught. One mink could not easily catch these small fish, but the other two succeeded in catching them very rapidly.

In 1914 and 1915, we again experimented, but only in a small way and without results. We may try a new method in 1916. As a conclusion, we believe that the mink is not an animal fit to live in captivity; he needs the free space and to be compelled to find his food.

Our experiments with foxes have been a success.
Foxes We don't believe, however, that the red fox can be kept in captivity with satisfactory economic results.

Our experience with foxes is the same as that of others, except that the treatment of the mother with her young is perhaps not so delicate a matter as has been stated. We have also noted that the mothers, though well mated, have not all had one litter a year. From our own experience, only 35 per cent of mothers have litters.

The raccoon is an animal which may be very easily
Raccoon and economically bred in captivity. The one great difficulty is the prevention of their climbing and escaping. If this can be overcome there is no reason why the raising of raccoons should not be successful.

Museums as Aids to Forestry *

BY

DR. HARLAN I. SMITH

Museum of the Geological Survey, Ottawa

IN gaining due recognition and support from the great mass of the people, museums may be great aids to forestry. Even the further application of museum methods in forestry may be of valuable service. The extent of the possibilities in these lines, of recruiting aid by means of museum methods of publicity, recreation, instruction, and research, can hardly be forecast. Such museums or methods, however, must be properly administered to be effective. The methods used, for instance, in the large and costly Botanical Museum, in New York, would be of little or no avail to forestry. That museum may be of use to scientists, but is not of much human interest to me, and, therefore, I judge, not to the average citizen, lumberman or forester.

Small Expense of Equipment Vast expenditure of time and money is not necessary to secure valuable aid by these means. Museum cases, if such are really required, may be made at a cost of less than four dollars per foot front. A large collection of specimens, maps, photographs, and labels is not required to inculcate ideas of the practicability and economic importance, to say nothing of aesthetic values and love, of forestry. A small exhibit may teach the general and valuable principles of forestry, perhaps, even better than a complete exhibit of all kinds of trees, such as is shown in the American Museum of Natural History in New York. Such a complete exhibit might confuse, or burden. Those whom it was desired to influence on behalf of forestry might be lost in the woods, as it were.

Museum in Rocky Mountains Park In the Rocky Mountains Park museum, at Banff, Alberta, a beginning of a tree exhibit has been made. There are eleven species of trees in the park. Five grow in the valley, but the other six are found only on the higher land. A complete collection of the trunks and leaves of the trees growing in the valley was made in two half days while also engaged in other work and without any expense except as for time in cutting the trunks to lengths for exhibition. Two photographs were also made of each of these five kinds of trees; one of a

* Published by permission of the Deputy Minister of Mines.



BALM OF GILEAD TREE—DETAILS OF TRUNK, LEAVES AND BARK



GROVE OF BALM OF GILEAD IN ROCKY MOUNTAINS NATIONAL PARK



grove or group of each kind of tree from a distance, and one of the details of the trunk, bark, leaves and such flowers or fruits as were then in season. Later photographs are to be made of the parts of the trees not yet taken and of uses and abuses of each tree and its products. Tentative labels had previously been prepared by the late Mr. Abraham Knechtel, Chief Forester of the Parks Branch of the Department of the Interior. These refer particularly to the park and are to be revised so as to serve as labels to the same trees in any other museum that may require the labels. Supplementary labels, describing the peculiarities of the same trees as to the park, are also in preparation. The museum labels were printed on card of a yellow colour and in a brown ink to harmonize with their surroundings.

They were framed and securely screwed to the trunks of the specimens, so that they can not easily be removed. The glass covering protects the label from dirt and breakage. A handbook was also printed from the type before it was distributed. When these labels are revised, to include instruction and explanation of the most important of the forestry abuses and needs, and when specimens of uses of the lumber and other tree products, such as wood alcohol, charcoal, and turpentine, are added with full labels, this exhibit will be the beginning of a suggestion for a museum aid to forestry.

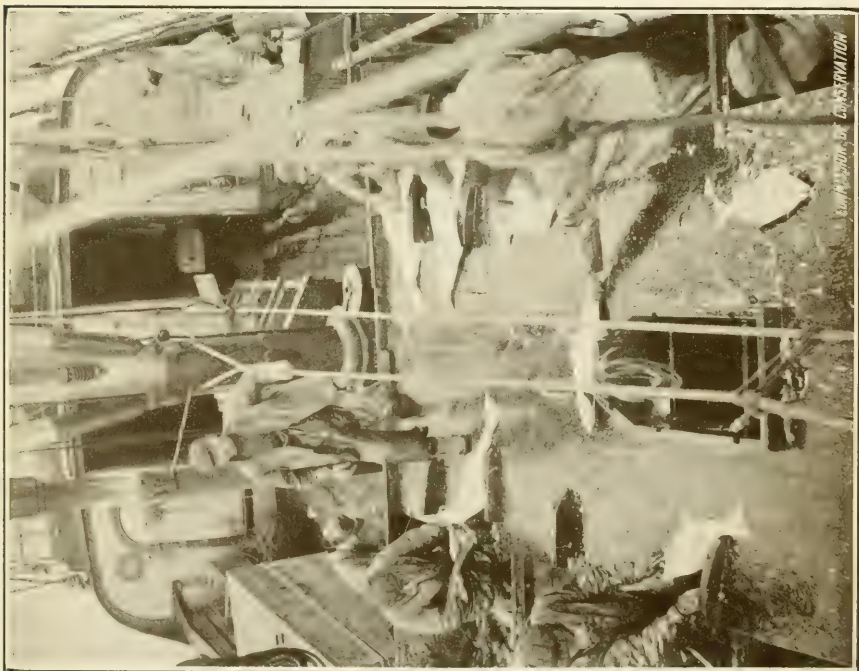
Information to be Supplied	<p>An example of such information as should go in a label is that the obnoxious pitch of the Balsam is so largely in the bark that the wood, formerly not used at all for wood-pulp, is exceptionally valuable for this purpose. The qualities of a great number of woods may be shown by the exhibition of the volumes of <i>American Woods</i>, published by Hough, and illustrated by cross, radial, and longitudinal sections of actual trees. To accomplish the best result, however, expert foresters, who know the scientific facts, must co-operate with those who understand people well enough to translate forestry facts into terms that not only can be understood by those whom forestry seeks to convert to its aid but into terms that will also attract those people to read the labels and study the specimens.</p>
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The same labels may serve as outlines for lectures, each label being illustrated by lantern slides made from the photographic negatives previously mentioned. It is part of the work of some progressive museums to give popular lecture interpretations of science as well as scientific lectures, and recreation based on instruction. Then, too, the museum may send out both travelling exhibits of forestry and lecture outlines made up of the labels, together with loan sets of lantern slides.

Science
Requires
Publicity

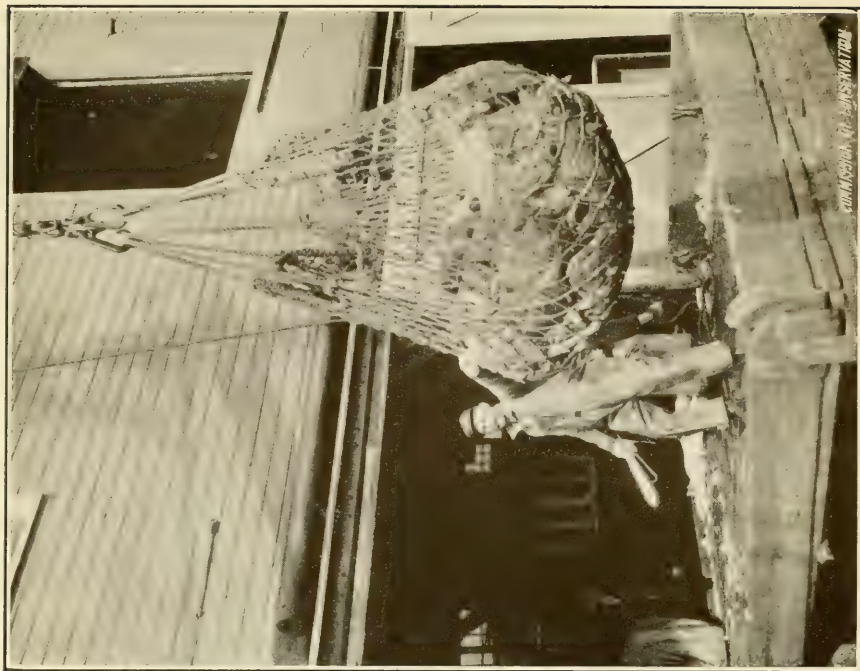
The president of the Ohio Academy of Science, speaking at the twenty-fifth anniversary of the Academy, stated that the existence of the Academy was unknown to the great majority of the people of Ohio, and a "Pan-American Scientific Congress," which met this month (January, 1916) in Washington, was organized, under the chairmanship of the third assistant United States Secretary of State with a program of nine sections, but ignoring Canada and also mathematics, physics, pure chemistry, pure geology, zoology, psychology and botany, so it was really a congress of American republics, neither Pan-American nor scientific. The United States Secretary of the Navy, in selecting the societies to elect members of the Naval Advisory Board, ignored the National Academy of Science, which is, by law, the adviser of the Government, and also ignored the American Association for the Advancement of Science, which is the great democratic body of over 4,000 scientific men of the United States and Canada. He apparently never heard of either association.

These striking examples seem sufficient to suggest that the forestry branch of science, as well as the whole scientific tree, would do well to seek aid by every means of publicity, recreation, entertainment, education and research possible. Since all these mediums are included among museum methods and in the work of up-to-date museums, the latter may become of great aid to forestry, while forestry may provide museums with many necessary scientific facts.



CLEANING THE HALIBUT

They are cleaned each day and placed on ice in the hold. While awaiting cleaning they lie in the square pens seen on either side, called "checkers," because they check the sliding of the fish from one side to the other of the deck as the vessel rolls.



LANDING THE HALIBUT

Large netsful are lifted with derricks from the hold of the vessel, and emptied on a platform; there the fishermen chop the heads off, and turn them over to the shore crew

The Problem of the Halibut

BY

WILLIAM F. THOMPSON

British Columbia Fisheries Department

ONE of the chief problems confronting fishery authorities on the Pacific coast is that of the halibut. Second only to the salmon in value, the landings during 1914 at Pacific Coast ports are estimated* at over 64,000,000 pounds, an apparent increase over 1913 of 9,000,000 pounds. It is believed that the figures for 1915 will show little or no falling off,† though there is a general conviction amongst those interested in the industry that the halibut is being depleted. This conviction is based upon the fact that the length of time required to complete a catch is longer than formerly, that the fishing vessels must proceed to more distant banks, that, on various well-known banks, the fish are no longer abundant and are growing scarcer.

Sea Fisheries
are Exhaustible

It is not generally realized that sea-fisheries are exhaustible, and it is urgently necessary, in the case of the halibut, to know what vitality there is behind the tremendous yield, and what measures may be taken to care for it. The real value of a species must be measured only in terms of what it is capable of yielding without damage to itself, and it behooves us to ascertain whether the present catch is a normal yield, or made at the expense of the future existence of the halibut; in other words, whether we are using the interest only or are also drawing on the principal. It is also necessary to determine the possibility of preventing the ruin of the industry, a problem which can only be solved by earnest research. The yield of halibut in the Atlantic is too small to provide the wealth of material necessary for research work without unduly prolonged and excessive effort. Hence, there is in the Pacific the last opportunity to deal adequately with the problem and it is passing rapidly.

Investigation
of Halibut

The British Columbia Department of Fisheries recognized that an enquiry, to be complete, must deal with the whole life of the halibut, including the growth, history, food, seasonal distribution, and period of fertility.

* From *Pacific Fisherman*.

† Since the above was written, the *Pacific Fishermen's Yearbook* has estimated the catch for 1915 as 1,410,280 pounds more than that for 1914.

The writer has been actively engaged upon the study of this problem since the spring of 1914. The work of collecting data was done on the fishing vessels, it being necessary to accompany them to the banks on each trip, and the conditions met with on the boats modified the procedure greatly. Much time was thus lost, as the vessels usually fished only when the weather was suitable, and were compelled to prospect a great deal until banks were found which yielded well. The conditions were anything but those to be found in the laboratory, and, as accurate work consumes time, it was rarely possible to examine as many as 100 fish a day. Nevertheless, nearly 3,000 specimens have been examined in the course of the work.

It is perhaps natural to ask why it was not possible to examine the fish when they were brought ashore, and thus avoid the disagreeable living and working conditions at sea. It cannot be too strongly emphasized that work of that sort would have been nearly worthless. The fish in any vessel may come from any bank; as all the viscera are removed, the sexes cannot be distinguished, and the cuts made in cleaning the fish, which is done on the banks, allow the head to assume an unnatural position and make the measurement of length inaccurate. The inability to distinguish the two sexes would alone be sufficient to invalidate any work after the vessels are docked.

Little Information Available There is very little existing literature on the halibut, and the field is practically a virgin one. Isolated notes have appeared, most of them conjectural or of little value, the most valuable being notes on the ova of the halibut, and its spawning season in the North Atlantic, observations made in a scattering way but valuable in corroboration of what has been discovered in the Pacific. It is believed that this is the first systematic attempt which has ever been made to work out the life history of the halibut. The fallacy of reasoning from the habits of other species of flatfish is evident, and nothing has been accepted as true unless shown so by actual data obtained. The writer, however, freely acknowledges that the direction of his efforts has been very largely influenced by the splendid work of the English, Scotch and German writers on the plaice (*Pleuronectes platessa*) of the North sea.

Physical Characteristics There are few commercial fish which exceed the halibut in average size, and among those of the north temperate regions there are no important ones which individually exceed it in weight, save the sturgeon. It is simply a giant flounder, active and predacious, one of the group with its eyes both on one side of its head, a bottom dweller with the habit of lying on one of its sides, hence very dark on the upper or right, and white

on the lower, or left, surface. The female sometimes reaches a length of over six feet, and a weight of over two hundred pounds, though as a rule, the fish in any catch average from fifteen to thirty pounds.

**Vessels and
Handling**

The vessels used in the Pacific Coast halibut fishery are of two classes, steam and gasoline, sailing vessels being out of place in the long narrow inlets and passages of our western coast. The steamers are the familiar trawlers, of about 125 tons burthen, about 100 feet long, making as high as 11 knots, and capable of carrying 200,000 or 250,000 pounds of halibut on ice. Some of them carry dories, as many as 12 in some instances, but it is becoming more and more necessary to use the method known as "long lining," or fishing from the deck. With two fishermen to a dory, the engine and deck hands bring the total crew up to thirty or thirty-five. The gasoline boats vary greatly in size, the largest being 100 tons burthen, but they do not usually carry more than six dories. A great many small ones are manned by two men, who do not use a dory but fish over the side.

**Rapid Delivery
of Halibut**

Each trip usually lasts about two weeks, longer in winter, however, than in summer, and the fish are cleaned and kept with crushed ice in the hold. On landing, these fish are re-iced and shipped by fast trains, or placed in cold storage. The consumer often receives fish which have been on ice a month, and the quality of the flesh is such that it does not markedly deteriorate. Every condition has lent itself to the building up of a great market and to the rapid depletion of the supply.

It is difficult to realize the enormous part played by perfection of transportation facilities and the institution of cold storage methods. Halibut caught in the North Pacific, off Northern British Columbia and Alaska, are placed fresh on the markets of California and Massachusetts, at rates which, as the magnitude of the business testifies, are anything but prohibitive. There would, obviously, be no demand for the enormous yield unless such an extensive market were open.

**Methods Used
in Fishing**

Dory fishing only has been considered, as in "long-line" fishing proper data are rarely kept. The gear used consists of pieces of "ground line" or stout trawl line in lengths of about 400 fathoms, and, when not in use, coiled on a square piece of canvas, called a "skate," perhaps because of its resemblance to that fish. The whole coil has come to be called a "skate." On this line are attached short lengths of smaller line, the "gangings," with the hooks at the ends, about 265 to a "skate." Each dory, of which there are usually twelve on a steamer, uses two to four "skates" to a "set," tied into a single piece, baited with herring, or

other fish. The dories lay their lines parallel to each other over a bank, both ends of each line anchored and buoyed. The catch of the different dories used to be reckoned separately, as the men were paid according to the catch. This no longer obtains, but the fish in each dory are counted, as it is thus possible to see what part of the bank yields best, and so guide further work. The total number of fish for the day, divided by the number of "skates" used, gives a comparable index of the amount of fish obtained, and a clue to the abundance on the bank.

Trawling Trawl-line fishing destroys as many fish of other
Destroys Many species as are caught of halibut. Records made on
Other Fish the banks show a total of 193 halibut to 246 other fish, of which 171 were edible. At times, on certain banks, the catch is exclusively of some undesired species and all of these are usually discarded, often so badly injured that it is safe to say that few escape mortal hurt. A number of counts were made of fish as they came aboard one of the long-line vessels and the following table gives these. The red or rock cod come to the surface with their air-bladders distended, their eyes nearly popping out, from the release of the pressure under which they live at great depth. They, therefore, are unable to sink, and sometimes thousands of them cover the water for miles over the fishing banks. To eliminate this waste, the use of such fish should be given every encouragement.

NUMBERS OF FISH OF EACH SPECIES BROUGHT UP ON THE HALIBUT TRAWL—THE NON-EDIBLE FISH BEING MARKED WITH AN ASTERISK

	March, 1914				Dec., 1915			
Halibut.....	37	44	31	26	35	20	..	193
Black cod.....	22	4	22	11	11	13	83	....
Arrow-toothed halibut*...	8	16	7	12	1	..	44	....
Dog-fish.*.....	3	..	24	3	..	..	30	....
Skate.....	2	2	2	3	..	..	9	246
Red cod.....	3	1	4	3	21	36	68	....
Grey cod.....	2	..	5	4	..	..	11	....
Chimæra*.....	1	..	..	..	..	..	1	....
Total fish.....	78	67	95	62	68	69	..	439
Species.....	12	12	13	15	15	15	..	....

The Food
of the
Halibut

It is difficult to say whether a fish eats more of another valuable species than is legitimate, for it may also eat great quantities of some enemy of that valuable species. The fabric of marine life is so interwoven and complex that, with our present slight knowledge, we cannot separate the strands. Hence, one must not take too seriously food data which apparently testify against the halibut, but the incomplete results of these researches are presented below.

The following are consumed, many of which are not available directly as food to man: sea anemones, starfish, brittle-stars, sea-urchins, sea-cucumbers, worms, small shellfish, devil-fish, squids, crabs, (other than the edible crab), dog-fish, skates, red and black cod, herring, rat-fish, sand-lances and grey cod. Among the species of value are the red cod, black cod, herring, and grey cod, with perhaps certain small flounders. Only one species is markedly an article of food, namely, the grey cod, and at present there is no commercial fishery for it on the halibut banks. Among the mass of other food consumed the grey cod loses its relative importance. It is probable that any damage done this way is offset by the fact that the grey cod is digested to form halibut, and also by the destruction of probable grey cod enemies, such as the red cod and black cod. In fact, the extinction of the halibut might decrease the supply of grey cod rather than increase it.

Restricted
Area of
Halibut
Banks

An important factor in the life history of the fish is the area of the fishing banks. The width of the continental shelf is much less on the Pacific coast of America than on the Atlantic and, as a corollary of this, the fishing banks are restricted in area. There are no available published figures, but a close approximation made by us places the total area between the 140-fathom line and the outer coast, without the inlets, between the Shumagin islands in Northern Alaska and the entrance to the strait of Juan de Fuca, at 80,000 square miles. Of this, 19,500 square miles are off the British Columbian coasts. This area is distributed along the coast line of 1,600 miles, and hence has an average width of 50 miles. The total is much less than that of the North sea, and, in addition, the valuable fishing banks constitute but a small portion of the 80,000 square miles. Whether any extensive new banks will be discovered is problematical. One must, therefore, guard against the false conclusion that the Pacific Coast banks are very extensive, and must recognize the relatively small area as one of the contributing factors to rapid exhaustion.

Banks The peculiar length and narrowness of the Pacific
Easily continental shelf, renders it more easily depleted
Depleted locally, for there are no nearby banks from which
immigrants may come in any number. This is isolation, to a certain
degree, which should render itself evident in the origin of regional
races, with their own peculiar characteristics as to rate of growth
and dimensions. A bank is not surrounded on all sides by other banks,
but is connected by narrow shore line banks only; hence the idio-
syncrasies of the local stock are not entirely counteracted by inter-
change. In fact, such local peculiarities are of great significance in
judging the degree of isolation which might exist, the probability
of local extermination, and the rate of repletion possible by migration
from nearby banks.

In the work under consideration an attempt has been made to
gather such statistics and a good degree of success has been met with.

The rate of growth has been shown to be sharply different in
localities not far distant one from the other, as Frederick island and
Rose spit, but this will be treated later. That obtained by a series
of measurements of the head length is particularly striking, and is
indicative of what may be expected of other data dealing with measure-
ments of body depth, height or length of fins, counts of fin-rays, etc.,
when such are compiled.

It is evident that there is no extensive interchange of fish between
localities, otherwise such differences as are given could not remain
permanent. The progressive depletion of the banks from the south
northward is therefore comprehensible. It has been like the anni-
hilation of an army in detail, each separate detachment encountering
the full force of the fishing fleet, which might be resisted if the resources
of the remainder could be called on to aid. Fortunately it does not
pay to fish a region over closely when by going a distance an abundance
may be obtained, so there are still fish to be caught on the southern
banks and presumably propagation continues there. But only when
too late does one know when a species has been depleted on a bank
past the limit of safety.

Slow Growth Not only does the nature of the coastal bank lend
of Halibut itself to rapid depletion, but the nature of the species
 itself is such as to render it little resistant. It will
be recalled that it was said to be one of the largest of market fish,
and, reasoning from this, it is evident that a larger area of bank is
necessary to support each individual than is the case with smaller
fish. The total population must hence be less, and, as the increased
size renders it less difficult to catch great quantities, the rate of
depletion is correspondingly rapid.

If it took merely a few years to grow a fish of such a size, this would not be so serious, but, as a matter of fact, one of the earliest and most important of the results of the investigation was to show the slow rate of growth and the comparatively great age attained. The table following gives this in figures, as extracted from the report of the British Columbia Commissioner of Fisheries for 1914:—

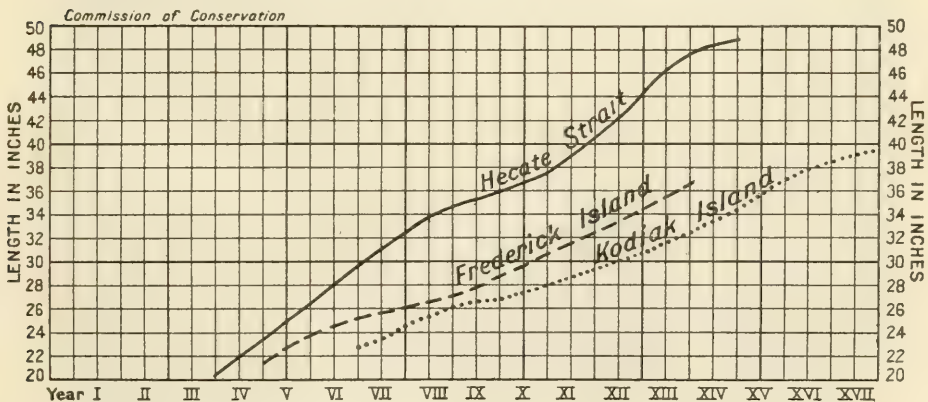
AVERAGE LENGTH IN INCHES OF HALIBUT AT ANY AGE

AGE	Hecate Strait		Frederick Island		Kodiak Island	
	Male	Female	Male	Female	Male	Female
III.....	(17·0)	.....	.....	.....	.....	.....
IV.....	19·3	20·6	(21·0)	(22·5)	.....	.....
V.....	(23·8)	24·2	(18·5)	(20·5)	.....	.....
VI.....	24·3	28·1	(24·6)	(28·5)	.....	.....
VII.....	27·6	30·7	(23·0)	(26·6)	(20·3)	(22·7)
VIII.....	31·6	35·4	(27·8)	(25·5)	22·4	25·5
IX.....	31·7	37·0	25·4	(25·1)	24·0	27·8
X.....	33·6	(35·6)	27·4	30·7	25·2	26·8
XI.....	34·3	39·3	29·4	32·8	26·3	28·6
XII.....	36·6	41·8	(27·5)	(30·0)	27·7	29·0
XIII.....	39·4	51·6	(30·2)	(36·8)	28·8	31·8
XIV.....	(39·0)	48·2	(31·5)	.....	29·0	34·5
XV.....	(37·7)	49·9	.....	.....	29·7	(33·8)
XVI.....	42·8	.....	(37·5)	.....	32·4	38·9
XVII.....	(41·5)	61·2	(37·5)	.....	(32·1)	(42·4)
XVIII.....	(43·0)	69·0	(38·2)	.....	(36·4)	38·4
XIX.....	.....	(65·0)	(36·7)	.....	(30·7)	.....
XX.....	.....	.....	(37·5)	.....	.....	.....
XXI.....	.....	(55·2)	.....	.....	.....	.....
XXII.....	.....	(57·7)	.....	.....	.....	.....

NOTE.—The figures in parentheses are based on too few specimens, less than five, to be considered at all conclusive.

AVERAGE LENGTH OF FEMALE HALIBUT AT ANY AGE, WITHIN LIMITS
CAUGHT BY HOOK.

Kodiak island, 125 specimens; Frederick island, 32 specimens; Hecate strait, 170 specimens.



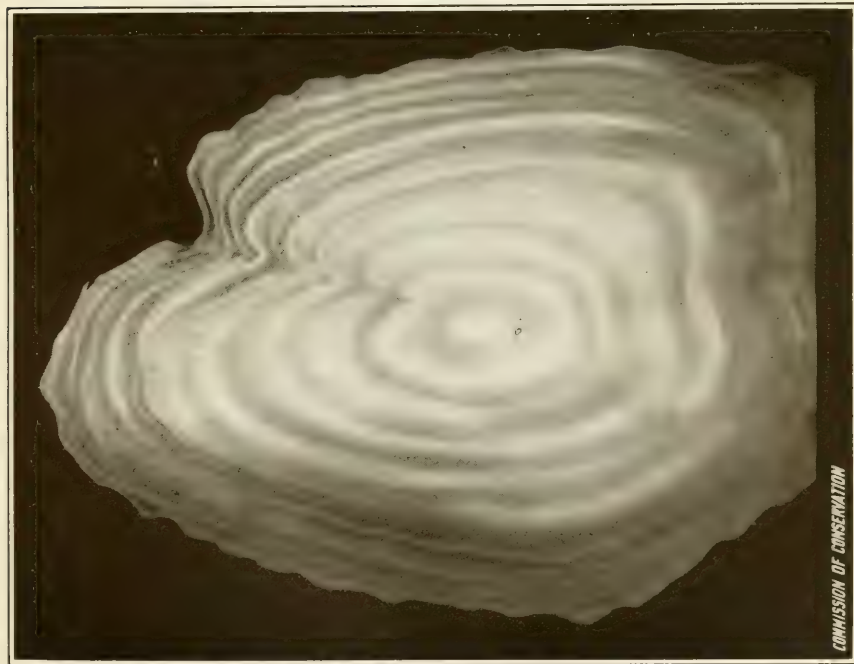
Methods of Determining Age The methods employed in obtaining these age determinations have been the same as those used with such good effect in the case of the plaice (*Pleuronectes platessa*) of the North Sea and in the case of many other fish. It has been found that, during a year, there are great fluctuations in the rate of growth of any fish, it being very rapid during the summer and almost nil during the winter. This fluctuation leaves its traces on all the hard parts of a fish and a difference in structure between the parts laid down during the different seasons can be distinguished. The bones of the body, especially the vertebræ and gill covers, show this differentiation, but these are not nearly as readily utilized as are the scales and the limy concretions in each ear-chamber, called "ear-bones," or otoliths, which show annular rings in many ways strongly resembling those of trees. In the case of the halibut, the otoliths were found to be the best, and were consequently used. In other species, by actually raising fish, it has been demonstrated that the age is correctly given by these structures.

**Halibut
Reaches
Great Age**

The oldest halibut obtained had reached twenty-five years,^a but the great majority seemed to attain an age of between fourteen and nineteen years. The youngest caught were three, four and five years old, the size of the hook used apparently preventing the capture of smaller and younger specimens. The females from Hecate strait had an average length of two and a half feet when seven years old, and four feet when fourteen years old. A fish four feet long would weigh between 60 and 70 pounds. It will be seen that the rate of growth on different banks is very different and that of males is much slower than that of females. By utilizing those figures based on enough specimens to be correct, or by using smooth curves, it was found that the males are but 88 per cent (about $\frac{7}{8}$) of the length of the females, practically the same proportion when any one of the three banks is considered. A male of 26 lbs. (35 inches long) would be the same age as a female of 35 lbs. (40 inches long), the male being but three-fourths of the weight of the female, and in comparing rates of growth on various banks the same sex should be used.

**Variations
in Size
and Weight**

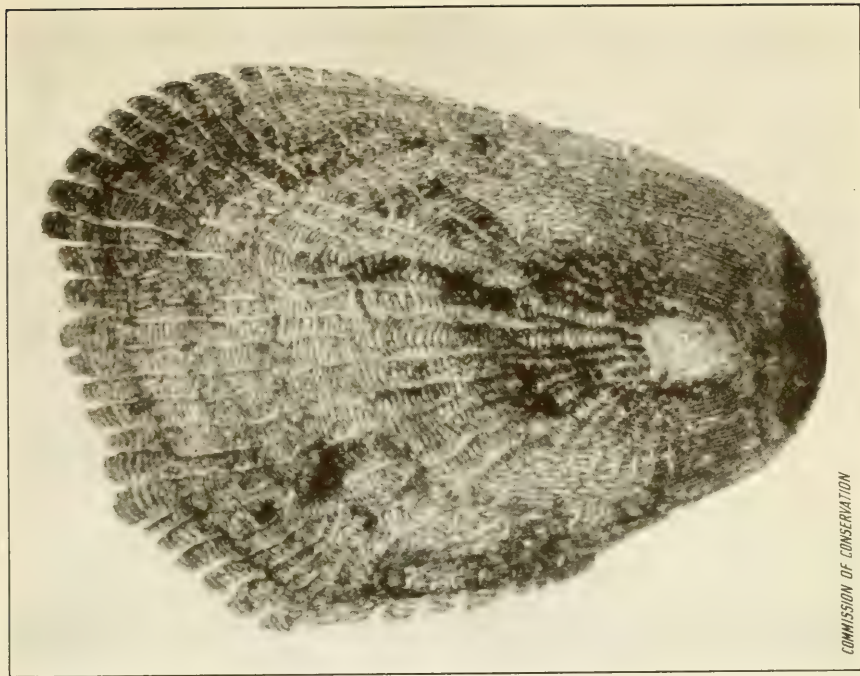
There is also a striking difference in size attained by the fish from the different banks. A fish 26 lbs. (35 inches long) from Frederick island is approximately the same age as one 45 lbs. (43½ inches long) from Hecate strait. In other words, the fish from Frederick island average but 55 to 60 per cent of the weight of those from Hecate strait. The fish from Kodiak island are, in turn, smaller than those from Frederick



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AN OTOLITH, OR EAR BONE

There is a pair of these in the head of each fish, which increase in size as does the fish itself, and in the same unequal way, slowly in winter, quickly in summer, so that the solid substance varies in composition with the seasons, and, as in trees, each year has its record in a ring; this otolith would indicate ten years of growth.



COMMISSION OF CONSERVATION

A HALIBUT SCALE

Not nearly as clear as the otolith in its indication of age, but showing the same alternation of fast and slow growth

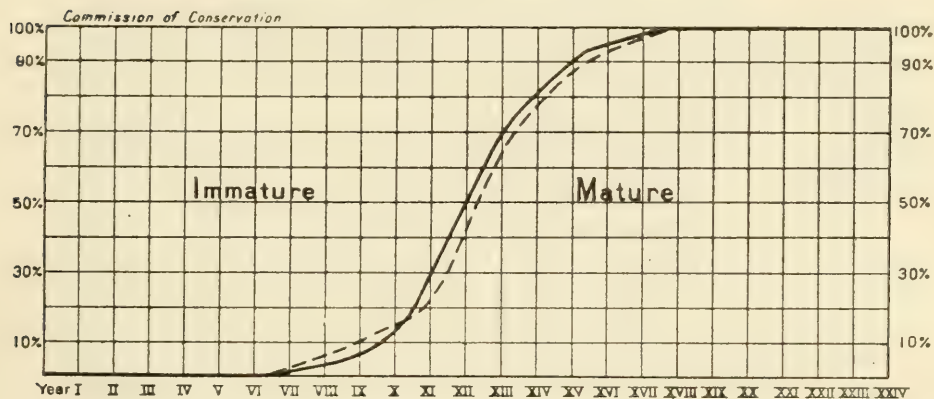


island. They are approximately 73 per cent of the length and 40 to 52 per cent of the weight of those from Hecate strait.

This work on the rate of growth and the difference in this regard on different banks has met with complete corroboration from another source, namely, that of the age at sexual maturity. On the Hecate Strait banks, one-half of the females mature at the length of 43 inches, on the Frederick Island banks at 35 inches, and off Kodiak island at 30 inches. These lengths are in each case those reached during the twelfth year, according to the otoliths. Thus it is at least evident that the relative sizes reached at maturity indicate the same comparative rates of growth as do the otoliths.

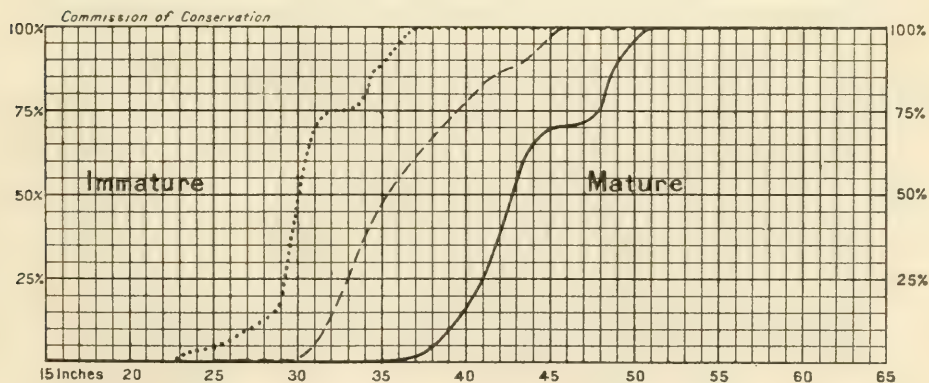
PERCENTAGE OF FISH MATURE AT ANY AGE.

Hecate strait ——— Kodiak island - - -



PERCENTAGE OF FISH MATURE, AT ANY LENGTH, FROM KODIAK ISLAND, FREDERICK ISLAND AND HECATE STRAIT.

Kodiak island. Frederick island - - - Hecate strait ———



**Rate of
Growth
of Halibut**

These data as to the maturity age of the halibut are significant from another standpoint than that of mere corroboration of the rate of growth. Indeed there is no more important phase of the life history of an animal than its sexual period, as this is directly concerned with the propagation of the species. The accompanying charts indicate the age and size at maturity, although, of course, it is difficult to obtain any idea of the length of life after maturity is attained. It is probable that the numbers of the species diminish nearly as rapidly in the classes which are mature as in those which are immature and that the fish rarely attain a greater age than eighteen or nineteen years. This has yet to be worked out, but enough has been done to show that different conditions exist on different banks and that, in some cases at least, over-fishing has diminished in a marked degree the percentage of mature fish. The greatly decreased average size of fish caught on Rose spit and Two Peaks are suggestive in this regard, and indicates that almost all the catches are composed of small, immature fish.

**Danger
of Future
Depletion of
Banks**

The present average size of fish caught on these banks is about twelve pounds, and no females are found mature under twenty-six pounds, hence mature females probably exist in small proportion. At all events, it is certain that maturity comes at a late period in the life of the halibut, and that, under certain conditions the majority never reach that state. This abbreviation of the sexual period is something which needs the closest attention, as it is vitally connected with the existence of the species. The percentage of mature fish on the banks should be constantly watched, as it, better than the abundance of individuals, indicates most unmistakably the danger of depletion of the banks. This would be analogous to the inspection of the spawning beds of the salmon, where a lack of spawning fish presages a small run when that year's brood returns as mature fish.

An attempt has been made to work out a method of distinguishing mature and immature fish at any time of the year, other than the spawning season. This is not yet complete, and is subject to certain qualifying conditions, which do not, it is believed, impair its validity. It is based on the fact that in the female gonad, or organ bearing the sexual products, provision is made for future years, a certain group of ova becoming ready for spawning every winter. This readiness is indicated largely by the attainment of large size and each future year's group may be recognized by its distinctive diameter. The growth is extended over several years at least and it is possible to see in preparation the groups destined for each year in the near future.

By carefully measuring a number of ova they may be clearly distinguished one from the other and the years of maturity readily assigned. Practice enables anyone, as a rule, readily to decide, by the appearance of the ovary, its opacity and the size of the largest ova, whether a given fish is destined to spawn the following year.*

Factors Leading to Depletion The factors affecting the depletion of the banks, may be tentatively enumerated as follows:—

1. The comparatively small extent of the banks in proportion to the great catch, with the peculiar length and narrowness of the continental shelf on which they lie;
2. The large size of the fish;
3. The slow rate of growth, indicating the comparatively long time required to reach market size;
4. The late maturity of the females.

Enough work has been done along these lines to indicate that they are valid causes of depletion, but it is, as yet, impossible to definitely apportion their relative importance. A great deal of work remains to be done to complete our studies of these depletion factors. It is, however, axiomatic that any attempt to conserve the supply of halibut must take into consideration these causes of depletion.

Rapid Depletion of Eastern Banks We must procure demonstrable data respecting the rate of depletion and a special effort has been made to obtain such data. The history of the banks on both the Atlantic and Pacific has been one of rapid depletion. In 1830, the New England cod fishermen regarded the halibut as nuisances but, once a market for halibut was established, the demand increased with the supply, and in 1884, vessels were going to Iceland and Davis strait for cargoes. The banks to the south soon became entirely depleted and now no halibut are found there. The catch landed at Gloucester has fallen from 11,300,000 pounds in 1879 to 4,024,000 in 1910. The fishery on the Pacific coast is not as old, the first cargoes being landed about 1888, but it is being pursued most energetically, and, owing to the great increase in the number of vessels employed, and the use of banks further afield, the total yield apparently does not indicate a marked decrease. The statistics of annual yield do not indicate the depletion of the banks until long after it is well advanced. Unfortunately, also, returns are very fragmentary, compiled in anything but a systematic manner and, hence, are unreliable.

* For details, the report of the Commissioner of Fisheries for British Columbia for 1914, should be consulted.

Information as to the yield, however, can be gathered from the ships' daily records or logs. These logs are the notes kept by the officers concerning the movements of the vessels, the amount of gear used, and the catch. These were not at first accepted as accurate, but extended acquaintance with the fishermen and their records has shown that they are as accurate as is necessary. The depletion of the banks has been shown to be so pronounced as to override any variations in records due to inaccuracy, which, at most, are not greater than in the average commercial record. The captains and mates are, as a rule, intelligent men.

Results of Investigation Provided one is well acquainted with the banks and with the methods used, there is no reason whatever to doubt the accuracy of the results obtained by a study of the logs. The methods of fishing have been already described, and the meaning of the term "skate" as a unit of gear, has been defined. The average yield per skate has been compiled from records of over five hundred voyages. Three-month periods were treated as units because the number of records per month was not always sufficient to give satisfactory average results. It showed that, during the summer months, the yield was heaviest and that there was a more uniform decrease. Comparing the years 1906 and 1912, the number of fish caught per "skate" was reduced about fifty per cent in six years—from an average of 42.8 fish per skate in 1906 during the summer, to an average of 21.9 in 1912. The logs of some vessels, for the six summer months, also show that the time spent per fishing voyage had increased proportionately, namely, from 3.4 days in 1906 to 8.9 days in 1912. In addition, the size of the catch actually decreased, despite the fact that, in early years, the dealers placed a limit on the cargo which might be brought in, the average load in the summers of 1905 and 1906 being 135,300 pounds and that in the same period of 1913 and 1914, 107,800 pounds. To demonstrate that these figures are representative and accurate the following tables are appended:—

SHOWING AVERAGE NUMBER OF FISH CAUGHT PER UNIT OF GEAR USED,
FOR SIX-MONTH PERIODS

Years.....	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
April-September . .	50.1	...	73.6	30.1	42.8	36.9	26.1	24.1	28.6	25.1	21.9	17.1	12.9
October-March . . .	33.2	19.5	12.2	23.9	18.5	12.9	11.1	7.4	14.1	10.7	8.5	6.1	6.3

THE PROBLEM OF THE HALIBUT

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SHOWING THE AVERAGE NUMBER OF DAYS FISHED PER VOYAGE IN ORDER
TO OBTAIN A CARGO

	Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.
1902.....	...	...	2	4.2
1903.....	4.6	3.2	2.1	3.4
1904.....	3.6	2.0	2.5	3.8
1905.....	4.6	3.7	3.7	4.5
1906.....	5.1	2.9	4.0	4.9
1907.....	5.4	...	3.8	4.5
1908.....	5.3	5.8	3.7	5.7
1909.....	6.7	3.6	3.7	7.5
1910.....	8.3	5.2	4.7	7.4
1911.....	9.8	6.9	6.9	7.4
1912.....	9.0	10.5	7.4	9.0
1913.....	No records	9.2	9.6	8.7
1914.....	8.8	10.2	10.0	10.6

SHOWING AVERAGE CARGOES LANDED BY THREE STEAMERS OF SIMILAR CAPACITY

Those marked with an asterisk (*) are averages affected by a limit placed on cargoes by the dealers.

Months.....	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Years 1905 & 1906.....	108,215	146,833	171,313	143,353	110,162*	141,235*	132,761*	157,313	126,967	97,287	78,340	125,988
Years 1913 & 1914.....	37,900	67,192	42,620	76,295	122,474	152,851	121,152	100,802	73,202	42,898	35,340	59,770

SHOWING NUMBER OF FISH CAUGHT PER "SKATE" ON ROSE SPIT AND TWO PEAKS BANKS DURING SUMMER AND WINTER MONTHS

Based on 226 records. The starred figures, being obtained from but three or four records, are not conclusive.

Years.....	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
October to March.....	56.7*	16.7*	11.4*	24.8	24.6	12.9	19.1	6.0	9.3	9.3	6.5	no records	7.9
April to September.....	no records	no records	no records	47.1	no records	27.5	22.5	18.0	27.9	25.2	19.3	11.1	9.2

SHOWING DECREASED AVERAGE WEIGHT OF FISH CAUGHT ON TWO PEAKS
AND ROSE SPIT BANKS

Year	Average weight	Year	Average weight
1902.....	25.1	1908.....	25.2
1903.....	no records	1909.....	26.8
1904.....	25.1	1910.....	16.1
1905.....	no records	1911.....	16.7
1906.....	33.9	1912.....	17.1
1907.....	no records	1913.....	13.4
		1914.....	12.3

Not only is the depletion very evident in the banks as a whole, but the same tendencies are evident in the returns from individual banks, as instanced in tables of catch on Two Peaks and Rose Spit banks. An alarming feature disclosed by the table is the decrease in average size of the fish caught on this bank, resulting from the capture of the larger and older fish.

**Growing
Market for
Other Fish**

It is evident, then, that there has been a great and marked decrease in the abundance of fish on the banks off British Columbia. This is shown by the above tables as directly and truthfully as possible, more so than by the statistics of fish landed, upon which advocates of fish conservation have usually based their arguments. When the catch is cut in half in six years, the rate of decrease on the banks is a very rapid one. It may well be asked what the ultimate result will be. At present, it ceases to be profitable to fish when a certain minimum return is not obtained, and that limit has been reached in our southern waters for the winter season. However, the rapidly growing market for other species, such as black cod, will enable vessels to fish there profitably, whereas before they could not. The demand that there be a close season during the winter by international agreement incidentally seeks to render vessels profitable by the elimination of the most unprofitable season when it is necessary to make longer voyages. Whether such a close season would benefit the halibut to such a degree that it would stand the consequently more severe attack in summer is as yet a question unanswerable, depending mainly on whether this closure would be made of sufficient length.

**Remedial
Measures
Advocated**

The discovery of the rate of depletion is the only direct method at present available for determining the abundance and vitality of the species. But it is sufficiently accurate to demonstrate to every one that we are using both the principal and interest; therefore, we must either conserve the former by lessening the drain or increase the yield by aiding

nature in the propagation of the young. A species may never be replaced. Its destruction is not the diversion of capital into new hands and new uses; it is the destruction of a tool, fashioned by hands man cannot imitate, which should make available the resources of the sea for an indefinite number of years.

Knowing, then, the fact of depletion, and certain of the causes, it follows that remedial measures should be sought. Through "artificial" propagation nature may be assisted by aiding the young fish to survive what is perhaps the most critical period of its life, or by giving it some measure of protection from its human enemies. But to assist nature effectively requires accurate scientific knowledge. Every detail of the life of a fish seems to have some bearing on the problem, and the more complete the knowledge the better the prospect of success. In the case of salmon, the breeding habits were, comparatively, easily and readily observed in a direct way and the early history of the fish was known in its broad features because of the conditions under which it spawns and lives. When the life history of a purely marine fish is considered a more obscure field is entered. The salmon migrates up the streams and breeds at easily ascertained times, but no one knows whether the halibut migrates, for all its movements are out of sight, nor, until recently, when it bred. The ova of the salmon are laid and they may be watched in their development, but the halibut ova have never been found, once they are laid, nor is anything known of how or where they develop. Where aid may be given or restraint used cannot be told until the life history is fairly well known. Only a little progress has been made along that line, which is necessarily a difficult one.

Uniform
Spawning
Season

The spawning season for the halibut in European waters, as derived from scattered records, seems to correspond in general to that on our Pacific coast.

We first ascertained the latter by examination of specimens sent in by fishermen and by actual observation. It has now been observed throughout in the gulf of Alaska. It extends from the end of December to the end of April. It is at its height probably in January or February, but it is still unknown whether the time varies with the latitude. The time of spawning was, of course, one of the first things it was necessary to ascertain.

Variations
in Rate
of Growth

There are few differences between the two sexes, and none of these may be relied upon to distinguish them at sight. The finding of such a one would

have saved a great deal of work in dissection and rendered available the catches landed at the wharves. However, there are real and

striking differences in the average rate of growth and proportions of the sexes. The difference in rate of growth has already been shown and the difference in length of head is given in the tables of variations between localities in the report of the British Columbia Fisheries Department for 1914, page 83. There is also a difference in the depth of the pocket in which the sexual organs lie but all these differences so overlap that they cannot be relied upon to distinguish individuals of the two sexes. Hence it is apparent that no measures can be taken to give far-reaching protection to one sex rather than the other.

Artificial
Propagation

The number of ova laid and their method of ripening are very important, not merely from a general standpoint, but as factors in artificial propagation. The gonads in the mature female at certain times of the year—just before spawning—contain large, loose ova. In the British Isles counts of the ova contained in the ovary range from 1,000,000 to 3,000,000. The count made by us of the ova in a forty-inch female from Pacific waters showed it to contain about 370,000 ova. This is very much less than the European fish, but it is probable that, as the lengths given would indicate, the latter were much larger and older. Probably the rule holds as in the case of the plaice, namely, that the number of large ova increases both with age and size. While the halibut carries great numbers of ova, this does not mean that it is prolific, because, as a rule, species which lay a great number of ova do so in order to overcome great natural obstacles to their survival.

Using the minimum, that counted by us, it is easy to reckon the volume which would be occupied by the mature ova. The ova, shortly before maturity, undergo a rapid enlargement, becoming transparent and loose in the ovary. The final diameter, as found in samples collected on the Pacific coast and preserved in formalin, is 3.67 mm. ($1/7$ in., nearly). For 370,000 turgid ova, this would yield a volume equal to between half and three-fourths of the bulk of the parent fish. We therefore conclude that the ova ripen gradually and are discharged over some period of time. If this conclusion is corroborated it will have a vital bearing on the collection of ova for propagation. In the case of the European flounder, it has been found necessary to keep it in captivity to obtain the entire yield. With the halibut this would be an impossibility without great expense, while the fact that the ova do not float would hinder the employment of brooding enclosures such as are used with the cod.

The work being done at present includes an elaboration of these facts, the importance of which is apparent. Dearth of Information Data should be gathered as to the development of the larvae, about which absolutely nothing is known. This implies research with plankton and otter-trawl nets. Nor is anything known as to where the young fish live. Probably they are to be found on the halibut banks, but it is necessary to have a sea-going vessel fitted for otter-trawling to collect any data on this score, and unfortunately there are no vessels of this character employed in commercial fisheries on this portion of the coast. A small otter-trawler was used in protected waters but no results were obtained. The need of such work is very urgent, as the halibut is rapidly decreasing in numbers, particularly in southern waters.

From the foregoing it is evident that it is still impossible to come to a definite conclusion regarding methods of protecting or aiding the halibut. The facts of the life history show the species to be peculiarly exposed to depletion and statistics demonstrate that such depletion is taking place. It is not possible to look forward to artificial propagation with any degree of optimism, and probably we shall be left with the alternative of restricting the operations of the fishermen. The work we are doing is handicapped by lack of apparatus, but, as a preliminary study of the problem, is worth while. Until we know the spawning habits, the migrations and the population of the different banks, and until we solve many related problems, it will be impossible to take action with definite assurance that it will be adequate.

Fire Protection in Dominion Parks

BY

J. B. HARKIN

Commissioner of Dominion Parks

FIRE protection in the forests in Dominion parks is undoubtedly one of the most serious problems confronting the parks organization. I intend, however, to deal with only two aspects of our fire work and not with our general fire work, which is much the same everywhere.

During the past year our special activities in fire protective work have related chiefly to the development of a portable gasoline fire engine for putting out fires when they occur; and to a campaign of education calculated to prevent the starting of fires.

Portable Fire Engine for Forest Fires	In regard to the engine I think it needs no argument to convince anyone that the surest way of putting fire out is to apply water. In forest fire fighting it is well-known, especially in a mountainous country, very little can be accomplished with buckets. It is a physical impossibility for men to carry water under fire conditions for any length of time, and it is equally true that usually when a man has climbed up a rough hillside with a bucket of water there is very little water left in the pail when he reaches the fire. It is the experience of nearly all who have been concerned in forest protection that most of the big fires are what are called secondary fires.
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As a rule fires are discovered early enough to permit of their being isolated in a small area. The usual practice is to then have a body of men to watch the fire to prevent it spreading from the burning logs, tumps and humus of the segregated area.

Very often a big wind storm comes up, carries the fire forward, despite the efforts of the watchmen, and a conflagration is the result. It was figured that if water could be got on such a confined area quickly and in quantity we could remove one of the most serious forest menaces. It was this that led us to figure on a portable gasoline fire engine.

It is obvious that light weight and high power are essential. A great deal of time and thought was given the subject. We were fortunate in securing the co-operation in this work of Mr. H. C. Johnston,

of the Railway Commission Fire branch, whose mechanical aptitude and varied experience in fire fighting and fire equipment proved invaluable. One engine was completed last spring. Its weight stripped is 118 lbs.; equipped with solid oak base, etc., for work 143 lbs. The engine is rated 6 H.P. It delivers 20 gallons of water per minute through 1,500 feet of hose. Assuming that it would take one man with a bucket 10 minutes to deliver 10 quarts of water at a fire you will see that this engine will do the work of 80 men. And of course do it at insignificant cost. The outfit is provided with parallel handle bars by which two men can carry it anywhere.

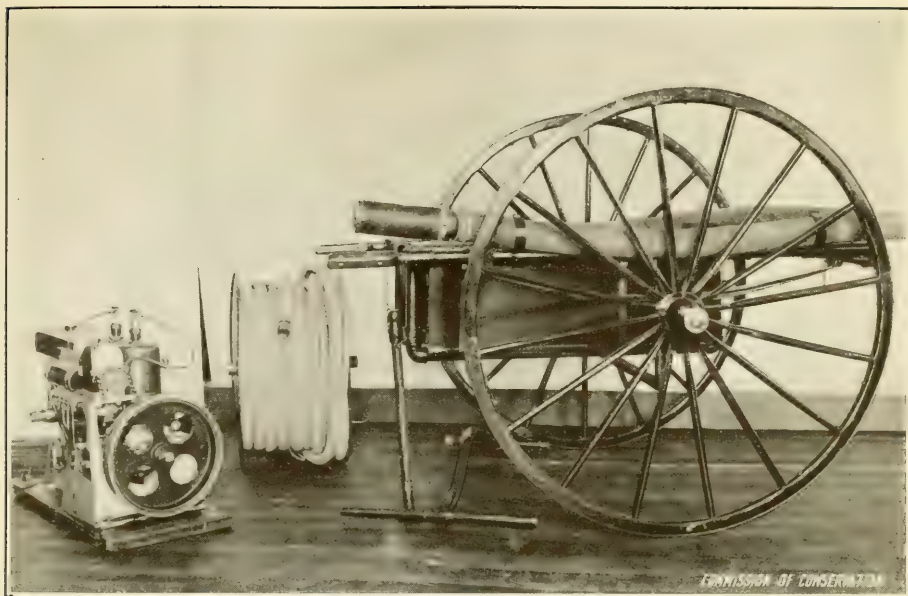
There are narrow gauge trucks by which engine and hose can be taken by horse-power over the better trails. The engine in its field tests has exceeded our expectations. There were no forest fires of any significance last season in Rocky Mountains park (where the engine was placed), but it was tried out in connection with the burning of large brush piles. Let me read you some extracts from reports in this connection. Mr. H. E. Sibbald, Chief Fire and Game Warden, who was in charge of the engine part of the time, reported as follows:

"The engine enabled us to burn the brush in large piles within a clearing of 40 feet in very dry weather without scorching the standing trees; also enabled us to keep fire from spreading along the ground and entirely extinguishing fires before leaving in the evening. Not one fire started up after being put out. We carried the water in one instance over a steep hill 200 feet high and along clearing for 600 feet, the gauge showing a pressure of from 85 to 90 lbs. This enabled us, by holding the nozzle close to the edge of the fire, to make a ditch from four to six inches deep all round the fire from the force of the water. This will relieve us of digging a trench round a fire, as it is through the hidden roots that fires always get away."

Mr. C. Phillips, Fire Warden, who continued in charge of the engine, wrote:

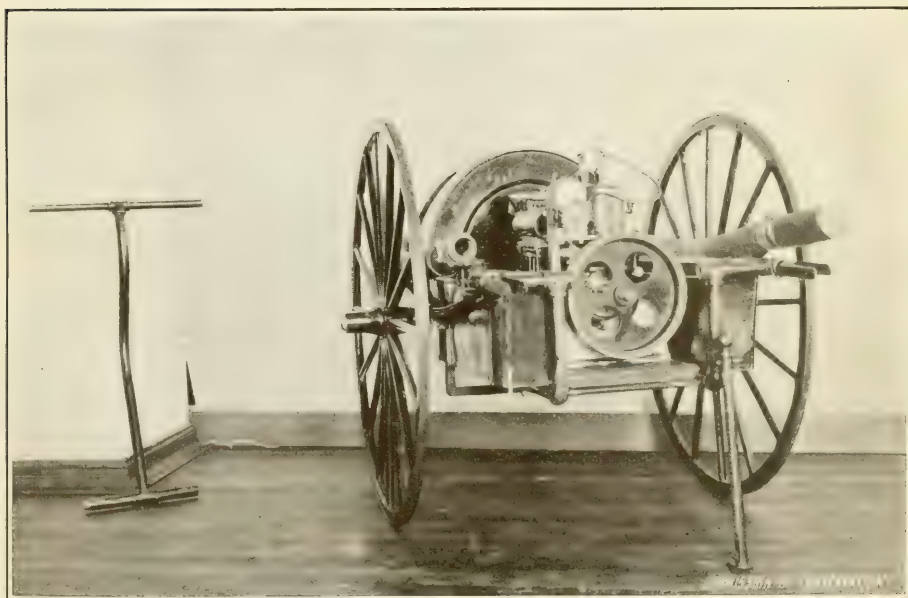
"The whole apparatus was given a very fair four-day test at the Alien detention camp at Castle mountain last month, while the aliens were burning large piles of brush and small timber, and the pump undoubtedly kept the fire within the required area.

"Water was taken from the river and pumped through 800 feet of hose to points where required, varying from 5 to 150 feet above the water level. A pressure of 90 lbs. was obtained at the outlet of the pump, and a stream of water was thrown about 40 feet at the nozzle."



FOREST FIRE PROTECTION IN DOMINION PARKS

Portable gasoline pumping engine detached from truck, also hose reel for carrying
200 feet of 1-Inch hose



FOREST FIRE PROTECTION IN DOMINION PARKS

Portable gasoline pumping engine mounted on truck, with equipment ready for hauling to a fire



At a test in Ottawa, the engine was taken to the foot of the locks, and, while the engine was not working as well as it should, through an unfortunate mistake in the mixing of the gasolene and oil, it worked steadily and pumped water 173 feet vertically to the top of Parliament hill. An engine of that kind, that can be taken any place in the mountains, by man-power if necessary, should be of great value in extinguishing fires which are guarded, and possibly, may be of great use in direct fire fighting. The intention is to use a battery of engines. One engine would pump through 1,500 feet of hose to a readily portable canvas basin, and a second unit would pump from that on. We might require a good many units, because we are never sure of having water close to a fire. The installation is not expensive; were it so it would be useless to consider it. The engine cost \$210, the hose \$165, or a total cost of \$375. By ordering in quantity we could no doubt secure a considerable reduction in these prices.

Use of Aliens
in Clearing
Work

The Forests Committee of the Conservation Commission last year called attention to the desirability of removing inflammable material in the woods on

Government lands outside of the railway right-of-way. We have made a beginning in that regard. I doubt whether we could have done anything under ordinary circumstances, because the wages of laboring men are three dollars a day in the West. We were fortunate, however, in having a camp of interned aliens engaged on road construction there, and, as the road ran parallel and close to the railway, we had them do a considerable amount of clearing along the railway tracks outside the right-of-way.

This cleared portion appealed so much to us that we extended it to our own roads. We had the aliens clean fifty feet on each side of the roads and they also trimmed off the trees. The improvement in appearance was such that, if we can ever get money for it, we intend to construct all our roads in that way. Incidentally, we protected our forest from fire. These roads are now being largely used by automobiles and carriages, and cigar and cigarette stubs and matches are carelessly thrown to the side; if there were debris there fires would likely be started.

Co-operation by
Private Interests
in Fire
Prevention

Another feature of our work has been a campaign of education. We have devoted a good deal of attention to it and we hope we have secured some results. It has cost practically nothing, and will,

we believe, contribute to the education of the public on fire prevention. Practically there are only two kinds of fires, so far as our parks

are concerned at any rate, those arising from human causes and those caused by lightning. We cannot prevent fires that are caused by lightning, but those of human origin are nearly always the result of ignorance or carelessness. Not one fire in ten thousand is started deliberately. It is simply another case of not knowing it was loaded—because the necessity for care is not realized. It is obvious that education is a first necessity. That has been said this morning and I presume, has been said for years. Those who have studied the psychology of it appear to be agreed that the way to influence the public is to use affirmation and iteration. This policy we have adopted.

Another factor in this campaign of education is the tremendous influence of habit. It is admitted that we are creatures of habit. Habit is at once our strength and our weakness, and we should, therefore, develop careful habits in regard to fires. With this object in view, we started our educational work with match boxes. We figured that, in the final analysis, practically all fires originate from matches and, therefore, that a match box would be a good medium of education. We took the matter up with the match companies of Canada, and they all agreed to put a fire warning notice on their match boxes. They had to change their labels, and they did it entirely at their own expense, because they thought the cause a good one. On every match box put out in Canada, except perhaps, a few safety match boxes, there is a fire warning notice. That means that nobody can take up a match box without seeing this notice, and we hope, by the process of affirmation and reiteration, to influence every man to some extent. On this notice, and all other notices which we arranged for later on, we had at the bottom, "Printed at the request of the Dominion Government," as we thought the man who, at his own expense, was carrying on this work, was entitled to that credit; we also considered it would add weight to the notice itself. So of the millions and millions of match boxes turned out in Canada to-day, practically every one bears a fire warning notice.

The match companies putting on the notices are: Eddy Co., Hull; Canadian Match Co., Drummondville, Que.; Dominion Match Co., Deseronto, Ont.; Eureka Match Co., Halifax, N.S.

Our object, of course, is to reach the people who are most likely to cause fires. It occurred to us that the hunters who go into the woods in the autumn were likely to cause fires; so we made the suggestion to the ammunition people that they insert a fire warning notice in each of their packages of ammunition. There are two companies in Canada manufacturing ammunition, the Remington Arms-Union Metallic Co.,

and Dominion, and both immediately agreed to put this notice in; the result is that every box of shells has a fire warning notice. Both of these firms went to a great deal of expense in getting out these notices. The Dominion people got out a nicely lithographed notice, showing a picture of a forest fire, with birds, moose, and various animals fleeing before the fire. It also contains a direct appeal to the sportsmen:—"The Canadian forests are your hunting grounds; will you not help to preserve them?" That is an appeal to selfishness. We try to induce the hunter to be careful of fire in order to preserve his own game. On the backs of the notices are the ordinary fire warnings about throwing away lighted matches, cigar stubs, etc., special attention being directed to camp fires, with a final injunction that a little extra care may save thousands of dollars, and innumerable birds and animals.

The Remington people have, on their own initiative, extended the campaign. They were much pleased with the original proposition because game preservation means a great deal to ammunition companies.

The greater portion of the sales of the ammunition people really is for hunting, not for trap shooting or the other sports with a rifle or shot gun, and it is therefore of vital importance to them to leave nothing undone to protect the game.

To extend the educational campaign the Remington people issued their ammunition box fire notice in the form of a poster stamp. This they furnish in quantity free to dealers for sticking on all parcels containing sporting goods. They thus reach the man who may start a fire, the man who may go into the woods. They also spread the gospel of care with fire by having a write up of their own efforts published in the trade papers and many of the newspapers. The ammunition companies have carried on this campaign entirely at their own expense.

Reaching the
Campers

Another class of people liable to cause fires are those who live in tents, either for recreational or other purposes. An appeal was made to tent manufacturers to insert a fire warning notice in every tent, so that a man living in a tent would, the first thing in the morning, see a notice: "Be careful of fires," and every time he entered the tent he would have the benefit of the iteration of that notice. The result is that nearly all the tent companies are inserting the fire warning notice, at their own expense, in every tent turned out. The notice is printed on a cloth label and sewn into the tents. This entails some expense but the tent manufacturers are satisfied that it is good business for them

to help protect the forests, as there would be fewer tents used if the forests were to any serious extent destroyed.

The following companies are affixing the notice in their tents: Bromley & Hague, Winnipeg; Edmonton Tent & Mattress Co., Edmonton; Finnie & Murray, Winnipeg; Grant, Holden, Graham, Ottawa; Robert Soper Tent Co., Hamilton; T. T. Turner & Sons, Peterborough; Edw. Lipsett Co., Vancouver; D. Pike & Co., Toronto; Smart-Woods, Ltd., Ottawa. Others intend placing notices next spring.

Educating the Woodman to be Careful	Educating the man who goes into the woods and works with an axe was next undertaken. We had a special axe label printed and H. Walters & Sons, axe manufacturers, of Hull, Que., undertook to have a label attached to every axe they made. The label is on thin paper, the same as is used for their own labels and they say it will stay on almost as long as the axe lasts. The label contains a picture of a forest fire and the motto: "No work for the axeman if the forests are destroyed by fire. Save them by extinguishing camp fires, cigar and cigarette butts, and live ashes from pipes." This should influence the man working with his axe in the woods and induce him to be more careful with fire.
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Many who use a telephone directory occasionally go into the woods, so we asked the Bell Telephone Co., to give us some space in their directory. We always ask for these things free and we get them. In the Bell Telephone book there is half a page of fire warning notice, which they have inserted entirely at their own expense.

Co-operation of Railways	The work already outlined, although started to benefit parks primarily, related to fire education in general, but the educational campaign was also carried on in other ways with special reference to the parks. The tourist and the railway are the two sources of danger in the parks.
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The machinery developed by Mr. Clyde Leavitt, of the Commission of Conservation, for dealing with railway-caused fires is so effective that the railway-fire is no longer the thread-suspended sword it used to be. However, while developing our educational campaign, it occurred to us we might help a little by making an appeal to the railway-men who cause the fires—the men on the engines; consequently we arranged with the Canadian Pacific and the Grand Trunk Pacific for the posting of a card in the cab of every engine operating through the parks with the following legend:

SAVE THE FORESTS

ENGINEMEN: If the forests throughout the mountainous Dominion Parks through which this railway runs are destroyed by fire, passenger traffic will decrease, fewer trains will be operated and you may be out of employment. Help the Dominion Parks Branch to protect the forests by exercising the utmost possible care with the fire apparatus on this locomotive.

J. B. HARKIN

Commissioner of Dominion Parks

Educating the
Tourist
Regarding Fire

To reach the tourist we naturally sought the co-operation of the railway companies.

The first step taken was to ask the companies to post fire notices in their coaches and to print notices on the time cards and on their dining-car menu cards. All the railways responded promptly. No doubt these various notices are now familiar to all of you. To further emphasize the warning, arrangements were made with the Canadian Pacific hotel department that a suitable fire warning notice should be printed on the menu cards of all the company's hotels in the parks. In addition, we printed an attractive card notice and had one hung in every guest room in every hotel in the parks. The card was worded as follows:

SAVE THE FOREST

You are within a NATIONAL PARK and you are no doubt impressed with the grandeur of the scenery and delighted with the evergreen forests. These are beautiful to-day, but may be desolate to-morrow unless you are careful in the use of fire. Your camp-fire, lighted match, cigar, cigarette, or the live ashes of your pipe may destroy many square miles of trees, shrubs, flowers, ferns, bird nests, and other interesting things. Therefore be careful with fire in the woods.

J. B. HARKIN

Commissioner of Dominion Parks

This card, in addition, was freely distributed in restaurants, stores and places of business in the parks. There are a number of moving picture houses in the parks and to these special fire slides were supplied and arrangements made that they should be displayed at no cost to the Department at all performances.

Practically all visitors to the parks do a good deal of driving or horse-back riding. Consequently we had two types of attractive

metal fire notices prepared; one was attached to the reins of all livery saddle ponies in such a position that the rider could not grasp the reins without noticing it, the other was attached to the dashboard and the backs of seats of all livery rigs in order that every one driving would have the notice constantly before him. The notice on the carriages reads:

SAVE THE FOREST

Do not throw burning matches, cigar and cigarette butts or live ashes of pipes from this vehicle.

The notice on the reins reads:

SAVE THE FOREST

Do not throw burning matches, cigar and cigarette butts or live ashes on the road side.

Of course, in addition to these various schemes, we also followed the usual practice of having poster notices distributed on all roads and trails in the parks so that no one could even walk around without learning the gospel of fire protection. For this purpose we used a special enamelled metal sheet in several colors and bearing a picture of a forest fire calculated to arrest attention.

We printed fire warning notices on our Parks Office stationery and at our request most of the hotels and business places in the parks also did so.

Fire Protection
Constantly
Before the
Visitor

In this campaign in the parks, it seems to me, we carried out a pretty complete campaign of affirmation and iteration. Fire protection was taught to the tourist from the time he began thinking of his trip, because he got it in his time card, he got it in the railway coach and in the dining car at every meal; he got it on the hotel menus and in the shops; he got it riding, driving, walking; in the picture shows; also when writing home, because it was on most of the hotel writing paper; and, finally, he got it when he went to bed. It may be that a campaign of this kind may almost drive him, in desperation, to set fires. At least that has been suggested, but it is a chance that we have to take.

Mechanical
Equipment
Essential

In the campaign outlined above, there are two or three points which it would be well to act on. Efficiency, in connection with fire fighting, can be promoted by paying more attention to mechanical means for fire protection purposes. So far as carrying on a campaign of education is concerned, our experience has been that the business

men of Canada have sufficient interest in fire protection and forest protection to co-operate at their own expense in carrying on a campaign of education. Acting on lines something like these, where you utilize as media various articles in constant and tremendous circulation, you have an opportunity of reaching almost everybody in the country, and, of course, the great advantage is that such a campaign does not call for the expenditure of large sums of money.

The Commission adjourned, to meet again at 10 a.m., on Wednesday, January 19.

Work of the Committee on Minerals

BY

W. J. DICK

Mining Engineer, Commission of Conservation

IN considering the whole question of the conservation of our mineral resources, while coal is probably our most important mineral asset, it is also the one in which the greatest waste occurs.

In 1911 and 1912, we made an investigation of the waste incident to coal-mining in Canada, the results being contained in a report, *Conservation of Coal in Canada*, published in 1914. It outlined the different classes of waste and emphasized the great importance of the waste arising from the method of disposal of coal lands.

Oversight of
Mining
Methods

In Manitoba, Saskatchewan, Alberta, Yukon, Northwest Territories and in the British Columbia Railway Belt and Peace River Block, coal lands have been disposed of under lease from the Dominion Government. No provision has been made, however, for coal-mining being carried on in such manner as not to render future mining operations difficult, nor has there been any supervision to prevent loss of coal through injudicious mining methods.

The Committee recommended that the Dominion Government appoint an engineering authority to approve of the methods employed at all mines operated under Dominion Government lease. Dr. Frank D. Adams, Chairman of this Committee, Mr. Chas. Fergie, M.E., and Mr. James White presented the matter to the Premier and Minister of the Interior, but, thus far, no appointment has been made, doubtless owing to financial conditions created by the war.

DISCOVERY OF PHOSPHATE OF LIME

Importance to
Agriculture

With the development of agriculture in Western Canada and the dependence for sustained soil fertility upon fertilizers and manures, there will arise a great demand for these products. For a growing plant nitrogen, potassium and phosphorus are especially necessary. These are taken from the soil in such large amounts by growing crops that,

unless precautions are taken, the fertility of the soil gradually declines, thus causing the exhaustion of the land, which has had such far-reaching consequences in many portions of the world.

Comparison of Fertilizers The nitrogen taken from the soil by growing crops may be returned by ploughing in crops of clover, which fixes the nitrogen of the air and conveys it to the soil as nitrogenous compounds. It can also be supplied directly to the soil as ammonium sulphate, a by-product in the coking of coal, or as nitrogen compounds manufactured from the air by electrical processes.

Potash, which is of equal importance, is usually present in soils in relatively larger amount, although in intensive farming this substance is returned to the soil through some kind of fertilizer.

Value of Phosphorus Phosphorus, in the form of phosphate, is specially important, and, unless the supplies absorbed by the crops are restored, the soil becomes gradually impoverished and finally ceases to produce a profitable yield.

Dr. C. G. Hopkins, in *Soil Fertility and Permanent Agriculture*, page 183, says:

"Phosphorus is the only element which must be purchased and returned to the most common soils of the United States. *Phosphorus is the key to permanent agriculture on these lands.* To maintain or increase the amount of phosphorus in the soil makes possible the growth of clover (or other legumes) and the consequent addition of nitrogen from the inexhaustible supply in the air; and, with the addition of decaying organic matter in the residues of clover and other crops and in manure made in large part from clover hay and pasture and from the larger crops of corn and other grains which clover helps to produce, comes the possibility of liberating from the immense supplies in the soil sufficient potassium, magnesium and other essential abundant elements, supplemented by the amounts returned in manure and crop residues, for the production of large crops at least for thousands of years; whereas, if the supply of phosphorus in the soil is steadily decreased in the future, in accordance with the past and present most common farm practice, then poverty is the only future for the people who till the common agricultural lands of the United States.

"And this does not refer to the far distant future only, for the turning point is already past on most farms in our older states and on many farms in the corn belt; and lands that have passed their prime with sixty years of cultivation will decrease rapidly in productive power and value during another sixty years of similar exhaustive farm practice."

In 1915 the wheat production of Canada was 393,049,525 bushels—averaging about 33·5 bushels per acre. Allowing two pounds of straw for every pound of grain, and taking the average analysis of wheat and straw, the following amounts of plant-food were removed from the soil during that year by the wheat crop alone:

Nitrogen.....	730,000,000 pounds
Phosphoric acid.....	250,000,000 “
Potash.....	358,000,000 “

In 1915, 20,437,130 acres of land were under cultivation in the three Prairie Provinces and the depletion per acre annually equals the phosphoric acid contained in 60 pounds of high-grade phosphate rock. At this rate 612,000 tons of high-grade phosphate rock would be required each year to offset the depletion of the land already under cultivation in Manitoba, Saskatchewan and Alberta.

With the exception of the apatite deposits of the Ottawa district, which are of relatively small extent and are no longer worked, no deposits of mineral phosphates were known in Canada. Large phosphate deposits have, however, been discovered in Montana, south-eastern Idaho, north-eastern Utah and south-western Wyoming, extending approximately 420 miles north and south and 220 miles in an east and west direction.

On account of the importance of this substance to the future agricultural needs of our Western provinces, it was deemed by the Commission of the greatest importance that efforts should be made to discover whether deposits of phosphate existed in Canada, especially as it had been suggested in the United States that a law be passed prohibiting the export of phosphate to foreign countries.

A study of the deposits of phosphate in the Western States, from reports of the United States Geological Survey, indicated the probability that similar deposits occurred in the Rocky mountains in British Columbia and Alberta. In July, Dr. Frank D. Adams, Chairman of our Committee on Minerals, and your mining engineer proceeded to Montana to study, in the field, the deposits which lie nearest to the Canadian border.

The phosphate deposits of the Western States occur at a definite geological horizon—near the top of the Carboniferous system—in an area which is really an extension of the Rocky mountains. The deposits near Butte were examined for the purpose of ascertaining their occurrence, the character of the rocks and whether they could be correlated with the Carboniferous rocks in British Columbia and Alberta.

Conservation
by Mining
Company Through the courtesy of the Anaconda Copper Mining Co., we visited their mines and smelters, and saw many instances of conservation of great interest and of instructive value. Among them were the elimination of the smelter fume nuisance, the re-treatment of slimes, the recovery of copper from mine water, coal dust firing, safety first instruction among workmen, and housing and recreation for employees.

In the Western States, no phosphate deposits have been found north of Helena, Montana, as no rocks of Carboniferous age occur between this place and the Canadian boundary, about 200 miles distant. The intervening area is underlain chiefly by rocks of Pre-Cambrian age, which are carried over the newer strata by the great Lewis overthrust fault. Near the boundary line, however, the Carboniferous reappears and its distribution is confined approximately to the Rocky mountains. The phosphate occurs as a bed, similar to a coal seam, and can be traced over a great distance.

Area Selected
for Examination Three lines of section across the Rocky mountains were selected and carefully examined, to ascertain whether along any of these lines the geological conditions were favourable for the discovery of phosphate.

These three lines were:

- (a) The North Kootenay pass.
- (b) The Crowsnest line of the Canadian Pacific railway.
- (c) The main line of the Canadian Pacific railway in the vicinity of Banff, Alberta.

(a) *The North Kootenay Pass*—This pass crosses the Rocky mountains about 20 miles north of the international boundary. When the geological reconnaissance of this district was made in 1883, it was mapped as Carboniferous, but is apparently much older. As the Carboniferous did not appear in this section, the phosphate horizon is not represented in this area. The Carboniferous has been recognized on the west side of the Flathead valley, and this section should be examined to ascertain whether the phosphate horizon occurs therein.

(b) *The Crowsnest Pass*—The succession at Turtle mountain is apparently of Devonian or Lower Carboniferous age, and, therefore, too low down in the series to contain beds of phosphate of lime of the age found in Montana and Idaho.

(c) *Banff Section*—Although 350 miles north of the nearest occurrence of phosphate in the United States, the Carboniferous section in the Rocky Mountains park, at Banff, resembles, in many

respects, that found in Montana. As a result of our investigations in this section, phosphate rock, similar in character to that found in the western states, was discovered. The phosphate rock was found as "float," in the bed of Forty-mile creek, and analyzed 53.95 per cent phosphate of lime; low grade phosphate rock was also found on Stoney Squaw mountain.

Further Investigation by Mines Branch As it had been demonstrated that deposits of this rock occurred in this locality, and as time did not permit of a more extended search, the expedition returned to Ottawa early in September. As it was not the intention of the Commission to do detailed work in mapping this area, it was transferred to the Dept. of Mines, whose proper function it is to continue this search. The Mines Branch sent a member of its staff to make an investigation in this locality, and, as a result, one phosphate bed about two feet in thickness and another one, at the same horizon elsewhere, about eleven inches in thickness were found.* Though these beds are not commercially valuable at present, there is very little doubt that prospecting will disclose valuable deposits.

The discovery made at Banff shows almost conclusively that, at the time the phosphate deposits were being formed, the sea extended from the most southerly limit of the western United States phosphate area, up to say, at least the Banff area, a distance of over 700 miles. Carboniferous rocks continue northerly to the Yellowhead pass; throughout this area, on account of the faulting and folding, the Carboniferous is repeated, and appears as bands parallel to the Rocky mountains, giving a large area in which there is great likelihood of phosphate being found.

In addition to the work which was done by the Mines Branch last year, that Department has decided to vigorously prosecute this search the coming summer.

Much has been already accomplished through the work of the Commission in discovering these phosphate deposits, and we may reasonably anticipate that thorough prospecting will disclose deposits that, in thickness and extent, approach more nearly those of the Western States.

A report on the *Discovery of Phosphate of Lime in the Rocky Mountains*, containing detailed results of this investigation, has been recently published by the Commission.

*The results of this investigation have since appeared in *Bulletin No. 12, Investigation of a Reported Discovery of Phosphate in Alberta*, Mines Branch, Dept. of Mines. In this report, it is estimated that, in an area of 24 square miles in the vicinity of Banff, there are over 26,000,000 tons of phosphate rock.

**Registering
Bore-holes** In *Lands, Fisheries and Minerals* report, published by the Commission in 1911, and again in a report on *Importance of Bore-hole Records and Capping of Gas Wells*, 1914, recommendations are made that all the holes drilled through coal formations in Western Canada be recorded with the Government, to protect future coal mining operations. If holes are drilled through coal measures to reach the oil or gas zone below, and, after finding natural gas, the casing is withdrawn and the well abandoned, the gas "feeders" will be dangerous to future coal mining unless accurate records are kept. In this connection an order in council has been passed by Alberta, requiring that mine plans be made only by persons holding mine surveyors' certificates. It was also provided that mine plans show the position of gas or oil wells with relation to the workings of any mine which approaches within a distance of 2,000 feet of such wells.

**Investigation of
Smoke Nuisance** At the last annual meeting the Committee on Minerals recommended that an investigation into the possibility of abating the smoke nuisance in Canada should be begun by the Commission, but your mining engineer, owing to pressure of other work, has been unable to advance this matter beyond the preliminary stages.

During the year a number of reports and articles have been prepared on different subjects dealing with the conservation of mineral resources.

**War and the
Mineral
Industry** The effect of the war on the mineral industry has been to increase the price of many metals; this has tended to stimulate mining and encourage the smelting and refining of ores in Canada. While certain metallic minerals have, in the past, received preliminary treatment in Canada, many metals, excepting lead, have been exported for refining. Recent reports announce the establishment in Canada of plants for refining both zinc and copper.

During the year, the Algoma Steel Co., at Sault Ste. Marie, Ont., and the Dominion Iron and Steel Co., Sydney, N.S., in connection with their by-product coke ovens, commenced the manufacture of benzol and toluol, the latter being used in the manufacture of high explosives. Beehive coke ovens, which waste all the by-products, are universally used in Western Canada, but it is reported that the Crowsnest Pass Coal Co. intends to install a by-product oven at Fernie, B.C.

DR. FRANK D. ADAMS: With respect to this report of the Committee on Minerals for the past year, there are one or two points

that might be brought out more clearly. The first is the great importance to Canada of the introduction of a more systematic and a more careful method of producing coke by by-product rather than beehive ovens. In Nova Scotia, where the great coal fields occur, the coal for smelting iron is coked in by-product ovens, and an enormous mass of valuable material is secured—sulphate of ammonia, a valuable product, and also benzol and toluol, of such great importance in connection with the war, might also be a further development of this work.

In Nova Scotia this work might be further advanced through the development of aniline. The German aniline trade—their enormous trade in colours—was based on the great supply obtained from by-product ovens, where it was distilled from coal in the production of coke. We hope this system will eventually be established in the western coal fields. Only about two per cent of our coal lies in eastern Canada, the rest being in Alberta and British Columbia. In the future production of coke from this coal, it is hoped the much more economical by-product oven will be used, so as to overcome the enormous waste. To establish by-product ovens and effect this saving requires large capital, while any person can build an ordinary bee-hive coke oven and make coke.

The discovery of phosphate was an interesting little scientific investigation, whereby one, sitting in Ottawa, is able to pick out a probable phosphate country, then go to the west and locate phosphate beds in the Rocky mountains. This was possible largely through geological work in the United States and by our Geological Survey in Canada.

With reference to the question of phosphates, Germany has built up a large trade through the preparation of phosphate fertilizers. There being very little crude phosphate in Germany, she imports enormous quantities from Florida and elsewhere. Germany practically controls the potash trade, and many of these fertilizers are specially prepared for certain definite purposes. Thus, as the citrus industry in Florida requires certain percentages of phosphoric acid, potash and nitrogen, the Germans compound the desired article by mixing the imported crude phosphate with their potash and nitrogen. They also make up complete fertilizers for various other purposes, and send them all over the world.

Potash in
Canada

Another point of great importance, is whether we cannot find deposits of potash in Canada. It is practically impossible for us to find deposits of potash similar to the German ones; but, locked up in the rocks of the northern Laurentian country, we have, in our granites, enormous

deposits of silicate of potash and feldspar. These are now awaiting the perfecting of a method to extract supplies from the old granite rocks. Whenever that can be done, Canada will have, in the northern country, an enormous and inexhaustible supply of potash.

HON. MR. DANIELS: I know the necessity to agriculture of phosphate, and I trust it can be distributed over this country at a reasonable figure. These gentlemen have laid us, as a Commission, under a tremendous debt by the discovery they have made. If this Commission of Conservation had no other reason for its existence than its initiation of this particular discovery, it has, in my judgment, well warranted its creation and existence. It must be of very great advantage to the country.

I was also impressed with the observation of Mr. Dick, on electro-chemical manufacture of nitrate from the air for the restoration of the soil. Have the experiments been practical?

MR. DICK: Undoubtedly, nitrogen can be extracted from the air by means of the electric spark, but it requires very cheap electric power. In Norway and Sweden, where very cheap water power is available, plants are being operated with success. The *Engineering and Mining Journal* recently reported that a large company was about to establish such a plant in California. Nitrogen is also extracted from air at Niagara Falls, Ont., in the production of cyanimid.

DR. ADAMS: I understand one of the great water-powers in the Saguenay district, of about a million available horse-power, has recently been leased to a United States company for this purpose. It is a simple process of burning up the hydrogen in the air and getting the acid. It requires limestone and cheap power. Sweden has exported 55,000 tons of nitrate of lime to Germany.

THE CHAIRMAN (Senator Edwards): The late Mr. T. L. Willson, of Ottawa, was working upon a proposition of that nature, and claimed to be absolutely successful. He was the originator of the Saguenay project, but disposed of his interests to an American company, which, I believe, is going to carry on the work. He proposed to harness Great falls, on the Hamilton river. Certainly it would be a great thing for this country if it could be put into operation.

DR. ROBERTSON: While it is commercially practicable to produce nitrogen fertilizer in this way, I do not think that Canada, agriculturally, will be much benefited by the application of that process. It is useful for certain particular crops, but, in Canada, we now need in the soil humus and vegetable fibre, as well as nitrogen

itself, and that can be accomplished advantageously everywhere by the use of clover, alfalfa and those things which fit in with ordinary farm products.

THE CHAIRMAN (Senator Edwards): It would still be of great advantage to Canada, because there are many parts of America that do not enjoy equal advantages with Canada in the respect Dr. Robertson has named. It would become a great commercial enterprise in Canada, even supposing that none of the product was used here.

Town Planning, Housing and Public Health

BY

THOMAS ADAMS

Town Planning Adviser, Commission of Conservation

I HAVE the honour to submit my report of the work of the Branch of the Commission which deals with Town Planning, Housing and other questions relating to Municipal Government and Public Health. The public health work of the Commission still suffers from the necessary absence of the Medical Adviser, Dr. Chas. A. Hodgetts, Red Cross Commissioner for Canada in Europe.

At the time my last report was submitted to the Commission this branch had been at work for about three months only, that is, from October, 1914, to January, 1915. My report dealt with that period in particular, but it also included an historical resumé of previous reports so far as these related to town planning, housing and municipal government. In that resumé reference was made to two definite proposals which came before the annual meeting of the Commission in 1914. These were:

1. Proposal to form a Canadian Housing and Town Planning Association, advocated at conferences held at Winnipeg and Berlin, Ont., in 1913, and supported on different occasions by Dr. Chas. A. Hodgetts and Mr. G. Frank Beer.
2. Recommendations of the late Lieut.-Col. Jeffrey H. Burland, as chairman of the special town planning committee, regarding the need for (a) educating the public on the subject of town planning, and (b) securing the establishment of a department of municipal affairs in each province.

My experience in Canada has impressed me with the wisdom underlying both of these proposals, and I hope to be able to show that definite progress has been made during the past year to give them practical effect. I will deal with the work of the year under the following heads, and refer, as I proceed, to proposals for future work:—

Effect of the war on civic improvement
Town planning legislation
Local application of town planning

Housing surveys and consideration of basis for housing legislation

Education of the public by means of:—

Conferences and meetings

Publications and collections of maps, etc.

Formation of Civic Improvement League of Canada

Conclusion:—Work for the current year.

EFFECT OF THE WAR ON CIVIC IMPROVEMENT

The war is naturally having the effect of curtailing the value of our work in regard to all phases of civic improvement, including town planning. There is practically no limit to the amount of work that requires to be done, nor to the energy that is needed to be applied to that work; but the work done is less productive for reasons which are obvious. Of course we have to recognize the altered circumstances and conditions which the war has brought about, for if we failed to do so we could not expect to grasp or hold public interest in our proposals. We have to revise our programme not only to meet new circumstances, but to justify our position as an expert body capable of adapting itself to changes that have taken place. It is not so much that new problems have been created as that new lights and new shadows have been cast on the old problems, thereby altering their relative importance. We have to realize the necessity of placing the emphasis where it is most needed, firstly, for the purpose of the successful prosecution of the war, and, secondly, for the purpose of securing the best possible adjustment of our social and economic conditions after the war. For instance, this is not an opportune time to advocate extravagant, or even what might be regarded as reasonably inexpensive schemes of re-planning or reconstruction of cities and towns for mere æsthetic reasons, but it is a time in which circumstances compel us to recognize the increasing importance of raising the standard of public health, promoting the welfare of the young, and conserving our resources by eliminating waste, and exercising economy in both national and municipal affairs. To assist, by study and investigation, to frame laws and regulations which will help us to attain these ends and to cure social evils, which persist in spite of our seeming prosperity, is our problem, made the greater and more difficult of solution because we have to try to solve it without large expenditure of public funds.

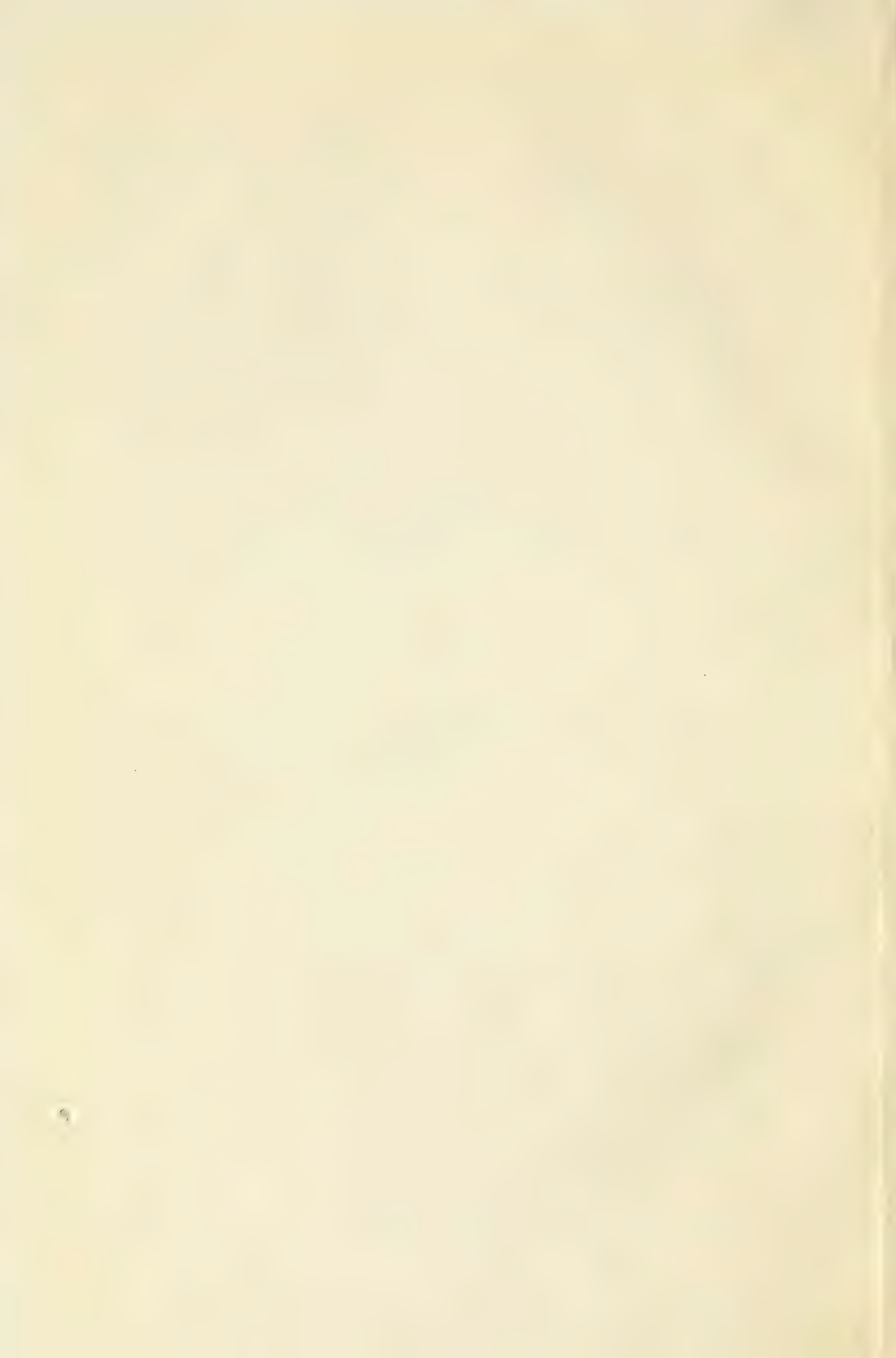
Need for Economy is Most Urgent	Probably the need for economy is more urgent and important, even in Canada, than we care to admit, but to cut down public expenditure in productive and useful enterprises is the last, and not the first, direction in which it should be practised. Indeed, one of the great reasons
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WIDTH AND DURABLE CONSTRUCTION DO NOT IN THEMSELVES MAKE A GOOD STREET
Too much constructed road surface means waste in cost of construction and maintenance, accumulation of dust, and also prevents natural features being used to make the street attractive and interesting



NARROW ROADS AND WIDE SPACES BETWEEN LINES OF BUILDING AND STREET LINES
Save the excessive cost of construction and maintenance as well as the trees.
Why have expensive wide roads in purely residential districts?



for personal economy, for the reduction of expenditure on luxuries, is that more of our capital may be made available, not alone for prosecuting the war itself, but also for building up productive enterprises at home. It is not true economy to put restraint on the employment of capital in building up the physical strength of the people and in promoting schemes which will help us to secure the means of maintaining industrial efficiency, if that is the only sacrifice we make, and no effort is put forth to reduce wasteful expenditure on luxuries. In other words, the need of the moment, in public affairs, is not necessarily that we spend less in public enterprises, but that we spend with greater care and sounder judgment, meanwhile taking such steps as we can to reduce expenditure on non-essential articles for purely personal use. To accomplish that need we require research and study into our public affairs and the application of science to the work of conservation in all its branches; therein lies an important work for the activities of this Commission.

Problems of Land Development Particularly in regard to problems connected with the use and development of land, either for building purposes or agriculture, and securing the best system of controlling our municipal business, do these activities require to be put in motion. There is, of course, a limit to the improvement that can be made in any condition as a result of change of system, but even the system itself may be such as to encourage or discourage the settlement and enterprise of the right type of men, and to secure the true or the false kind of economy.

Our system of land development, both in town and country, is an artificial creation, and, in so far as it has proved defective, it requires to be remedied by artificial means. Compared with other countries, our natural advantages in Canada are exceptionally favourable to the development of both agriculture and manufactures, but our system of controlling the uses and development of the land has been a partial failure and greatly needs a remedy. It was so before the war, but the changed conditions which are being produced by the war make the imperfections of our system more evident and the application of a remedy more urgent.

The remedy is needed, not only for the benefit of posterity, but in directions which may be made immediately useful to us in connection with the struggle in which the empire is engaged. In our cities and towns we want to study our system of local government and plan to avoid waste, and secure a sounder basis than we have at present for civic and industrial efficiency during and after the war. We have to find out by what means we can cut down expenditure on local improvements without injury to local enterprise, how far we

can improve the methods of raising money for public purposes so as to reduce heavy charges for interest, to what extent we can secure relief from the enormous burden of fire insurance in cities, what are the more economical and least harmful methods of dealing with unemployment if and when it occurs, how we should prepare to absorb in our cities or towns the returning soldiers who will prefer to settle in manufacturing centres, and how we can encourage the cultivation of idle land in suburban areas.

**Constructive
Policy in
Agricultural
Areas Needed**

In agricultural areas there is a crying need for a constructive policy, to enable colonization to be carried on under conditions which will produce greater stability and ensure permanent settlement. It is agreed that present methods are not satisfactory, and that the system of land division is partly responsible for the failure. Many different reforms have been suggested, and have sufficient plausibility to be worthy of being enquired into. We need rural planning as well as town planning.

The need for reform has been emphasized as a result of discussion of the problem likely to arise in connection with returned soldiers. They will want to earn a livelihood and it has been suggested that many will desire to turn to farming for that purpose. If that desire should exist to any extensive degree, do we regard ourselves as being prepared to deal with it?

**Caring for
Returned
Soldiers**

In Great Britain they are considering schemes to develop small holdings for returned soldiers, but, if men who return from war want to get back to the land, is it not likely that Canada can offer better attractions than any other country if we have the right system to make the most of the natural advantages we possess? If, with the return of peace, there is to be a great demand for land, we need to have, not only the supply to meet that demand, but the right conditions to organize and distribute the supply. This is a problem closely connected with town development and is not remote from town planning; it is also a problem which involves a certain amount of replanning of the agricultural areas themselves. Many people, including those accustomed to living in rural districts all their lives, crave the social attractions of the towns. A factor which makes people, habituated to rural conditions, migrate to the towns will be present in a stronger degree, in connection with attempts to settle men, who, like returning soldiers, have enjoyed the intercourse and facilities of town life. Such men are not likely to take kindly to living on isolated farms in districts remote from populated centres.

Agricultural Villages and Rural Industries What is needed is the establishment of well planned agricultural villages on good and accessible land. They must be planned in such a way that there will not be an entire absence of facilities for social intercourse, co-operation, transportation and ready means for marketing. These are necessary in combination to make farming pay, and unless we can make farming pay we cannot solve the problem of rural depression. Consideration will have to be given to the provision of capital, the training of inexperienced men, the selection of suitable areas, and the proper planning of agricultural colonies.

It is the latter with which we are concerned, and it is not the least important of the matters requiring public attention. In properly organized agricultural colonies, such as those which exist in Belgium and Holland, it is essential to have indoor rural industries situated in the village centres, and such industries could provide employment for many unsuited or unwilling to take up agricultural work. The establishment of rural industries in Canada might very well receive encouragement, apart from the question of providing for returned soldiers, with a view to increasing the number of small towns in agricultural districts and lessening the congestion of the larger cities. That is another matter which interests the town planner.

Encourage Small Villages and Towns Decentralization of our manufacturing industries is as desirable in the interests of the healthy town as it is in the interests of agriculture. Canada should encourage new settlers to migrate to the small villages and towns, rather than, as in the past, to provide attractions for them to congregate in large cities. The more widespread the population is the more healthy it will be, and the more it will help to solve many problems which have been created by our having thinly scattered agricultural population on the one hand and overcrowded cities on the other. The problem of providing for the returning soldiers and for the anticipated increase in immigration would seem to provide the opportunity for making an experiment in linking up the amenities and facilities of town life with the healthy conditions of the country.

Indoor rural industries develop individual skill, taste and character. They offer work and social amenities which are more congenial to many of the sons and daughters of the farmers than the work and conditions of the farm. In such industries articles could be produced which would be wanted by the farmer, at the same time creating a population which would need part of the produce of the farm, thus providing an interchange of markets in close

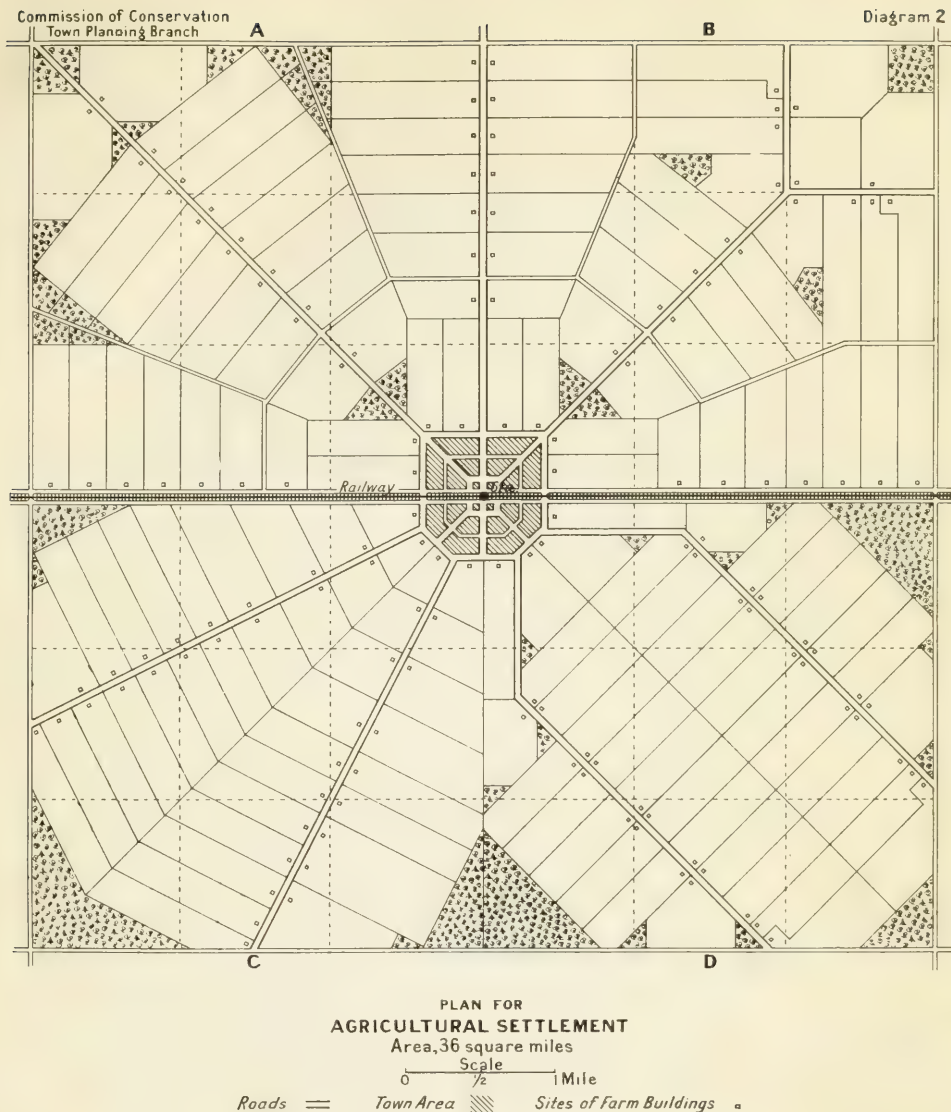
proximity to each other. In Belgium and Northern France the cultivation of the soil is made profitable only by reason of the work done and the money made in the homes of the peasants during the winter. In one neighbourhood alone, before the war, 36,000 people lived on 30,000 acres, engaged on the land in summer and in hand-embroidery, lace making, ironmongery, brush making, wood carving, etc., during the winter. The Canadian climate is peculiarly adapted for indoor winter work, and by proper planning, together with the employment of electricity for power, small village industries can be made as profitable as those of large cities.

Application of Scientific Methods	Some of the scientific methods and knowledge which have helped to create the great railway system and manufacturing centres of Canada might well be directed, for a time, to build up a system of colonization and good roads which would make agricultural life more attractive and add to the resources of the Dominion and the utility of the railways themselves. We have seen in the past few years that mere growth of population is not in itself a means of increasing material wealth—it is only when that growth is properly directed and controlled that prosperity comes with the increase.
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When immigration is renewed it will be too late to devise means to properly direct it, and it would seem desirable that some steps should be taken in the near future to enable adequate consideration to be given to the problem of improved methods of colonization. The importance of this problem has been brought home to me while studying municipal conditions for the purpose of preparing legislation to regulate land development in towns and rural districts. Great difficulties may confront us in any attempt to put these proposals to the test, but they are at least worthy of study and investigation.

Planning and Social Readjustment	It is our duty to apply all our schemes of planning and social readjustment, so that the war will leave us richer and not poorer in regard to our economic conditions, the stability of our productive enterprises and the health of our people. We, at least, need not if we choose, face a situation in which our industries are paralyzed because we have failed to prepare for peace, which is just as necessary as to prepare for war.
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Sanitary Science and Poverty	We have also to apply ourselves to the duty of raising sanitary and hygienic standards both in town and country. As an eminent visitor from the United States to Ottawa said recently, the sanitarian can only truly succeed in his work in proportion as he recognizes the need
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This and the succeeding diagram show eight different methods of planning quarter sections of townships. Imaginary areas are taken and roads are planned to secure (1) close settlement of the farm buildings, (2) convenience and directness of access to the town area and station, (3) reduction in length of road, (4) use of swampy and rocky land for timber reserves. The buildings are also grouped so as to obtain the best social facilities and economic use of wells for water supply. In the town area it is assumed there would be good facilities for obtaining education, medical advice, and recreation—and an organized co-operative agency under Government auspices to supply farm implements, seeds, etc., to the farmers and to collect and distribute farm produce. On this diagram the total length of road provided to give access to all the farms is 46 miles, of which 11 miles are secondary and not essential. Under an ordinary rectangular division plan the total length of road is 60 miles. Boundary roads are not included in either case. In addition to the saving in road construction and maintenance which would be effected by proper planning, there would be the great saving in time and team labour for the farmer, owing to the greater nearness of the farms to the centre. Fewer and more direct roads mean better roads, because it is possible to concentrate a given expenditure on a smaller area.



of the relief of poverty side by side with the need of applying sanitary science. True patriotism embraces the ideal of securing amelioration of social conditions, and we have to make these conditions worthy of the sacrifices now being made for them in precious human lives.

Make Use of Individual Enterprise A scheme to successfully attain the desired objects must be so framed as to make the utmost use of individual enterprise, to attract the right kind of men with small capital, and give some security of their success, to enable some financial support to be given to such men, to secure the utmost use of co-operative facilities in the making of purchases and distribution of produce, and to provide the necessary social and educational facilities within easy reach of the homes of the settlers.

When a proper scheme is devised for dealing with land settlement it will probably be found that Government financial assistance will be needed to enable such a scheme to be effectively carried out. The giving of such assistance, however, will surely depend on the character of the scheme, and on whether the government, whether provincial or federal, is convinced of its desirability and soundness. Hence, the making of thorough investigation into the problem and the preparation of a sound scheme are the first things to be done.

Diagrams of Agricultural Townsite In connection with my suggestions regarding the need for a better system of planning agricultural areas, I have prepared a few diagrams* showing the advantages to be obtained as a result of closer settlement of land and a more convenient and less costly system of roads. The objection to the present method is that it stereotypes the division of land according to a hard and fast system of survey without proper regard to topography, facilities for social enjoyment, convenience and transportation. The proposal is not to substitute a new for an old method of stereotyping development, but to substitute an elastic and scientific method for one which is based on no definite principles. Each township should be planned as a unit before settlement, and certain principles followed to enable the best results to be obtained. The diagrams are merely an illustration of some of the principles which require to be considered, and are not to be taken as indicating any particular point of view as regards size of farms or how a particular site should be dealt with. Different circumstances and conditions prevail in different provinces and in different parts of each province, and it is precisely because of these differences that a less

* See plates facing pages 122 and 126.

rigid form of land division is needed to encourage and facilitate agricultural settlement.

TOWN PLANNING LEGISLATION

During the year I have given considerable attention to the work of preparing a model Town Planning Act for the different provinces. This has involved a study of the Canadian conditions and the effect of recent developments in town planning legislation in other countries. The result of this work is seen in the revised Draft Town Planning Act which is appended to this report.*

Position of Town Planning Legislation	I will now indicate the position in regard to legislation in the different provinces beginning from the eastern seaboard:—
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Nova Scotia: The Nova Scotia Act of 1915 is largely the work of this branch, and I spent several weeks at Halifax preparing and revising the draft, in consultation with the committees of both houses of the Legislature. The assistance which we were able to give in this work was greatly appreciated and the advice given on your behalf was received in the best spirit and most of it was followed. If town planning fails in Nova Scotia it will not be for want of intelligent appreciation of its advantages on the part of the members of the Legislature. The effect of the Act is that town planning is now compulsory for the whole of Nova Scotia, as every district must have its Local Board and every Local Board must approve all new development and prepare a set of town planning by-laws or a scheme. I shall allude to actual local progress later.

Since the passing of the Act I have drafted three new sets of regulations, of a comprehensive character, and partly to meet entirely novel conditions. These are now before the law officers of the Nova Scotia Government. †

New Brunswick: New Brunswick has had a Town Planning Act in operation since 1912. It is a good Act, but entirely optional, like the British Act. During the year I have revised the procedure regulations for the New Brunswick Government, and it has accepted our suggestions. I have also suggested a form of memorandum to be sent out to local authorities to encourage them in using the Act. The memorandum and the regulations have been printed for distribution by the New Brunswick Government.

* See Appendix II.

† The regulations have since been approved and published.

Quebec: A draft Town Planning Act, in English and French, has been submitted to the Premier of Quebec and to each member of the Legislative Assembly and Legislative Council. The Premier has personally promised me that it will receive every consideration and I am hopeful that an Act will be passed in Quebec this year. Petitions have been presented to the Government urging the passing of legislation as a result of conferences held at Sherbrooke (representative of the Eastern Townships), St. Lambert and elsewhere. The Montreal Chambre de Commerce and other French organizations have presented resolutions to the Government supporting the proposal.

Ontario: Representatives of about fifty towns in Ontario met in conference from time to time during the past year and have petitioned for town planning powers to be granted to them. A draft Act has been submitted to the Premier and the Provincial Secretary.

Manitoba: A town planning bill will come before the Legislature during its present sitting. It is not in a form which we can entirely approve. Immediately after this meeting I am invited to go to Winnipeg to assist in revising the bill and getting it through the committee stages.*

Saskatchewan: A draft Act, prepared by us, has been revised by the legal advisers of the Saskatchewan Government, and is likely to be submitted during the current session. It will be necessary for me to go to Regina from Winnipeg to assist in the committee stages of the proposed Act.†

Alberta: The Alberta Act has been in force since 1912, but no procedure regulations were issued until this year. We made some suggestions for simplifying these regulations, and they have recently been printed and distributed.

So far I have dealt with seven provinces. Nothing has been done in British Columbia or Prince Edward Island in regard to legislation, except that draft Acts have been sent to members of the Government, with a suggestion that they should deal with them. In both provinces we have been promised by the Premier that sympathetic consideration would be given to our proposals. On the whole it will be disappointing if all the provinces do not have Town Planning Acts in force by this time next year, and the satisfactory feature is that they are likely to be really practical and effective measures, and comparatively uniform throughout the Dominion.

* As a result of the visit referred to the bill was considerably amended and the Manitoba Town Planning Act is now law.

† The bill reached the first reading in Saskatchewan, but, owing to political reasons relating to other questions, had to be suspended for a year.

LOCAL APPLICATION OF TOWN PLANNING

Only a very brief description of the local activities of the Town Planning Branch can be given.

Nova Scotia: During the year I have attended numerous meetings at Halifax, Dartmouth, Yarmouth, New Glasgow, Stewiacke, Truro, and paid visits to Amherst and other places. Local Boards have been formed in several towns under the new Act and advice given as to their work. Assistance was given in defining an area of Halifax, which has been set aside for residential purposes, and a town planning scheme for the city will shortly be prepared.

The meeting at New Glasgow was the annual conference of the Nova Scotia Union of Municipalities, when an opportunity was afforded of addressing representatives of the local authorities on the powers given under their Act.

New Brunswick: Visits have been paid and conferences held at Fredericton (with the Government), St. John, Sussex and Moncton. At St. John assistance has been given in preparing a town planning scheme—for about 20,000 acres. I have also been invited to assist in designing an area of land belonging to the city.

Quebec: At meetings and conferences in Montreal, St. Lambert, Quebec and Sherbrooke great interest has been shown in town planning. The Sherbrooke conference was representative of the entire Eastern Townships, and was unanimous in support of our proposals.

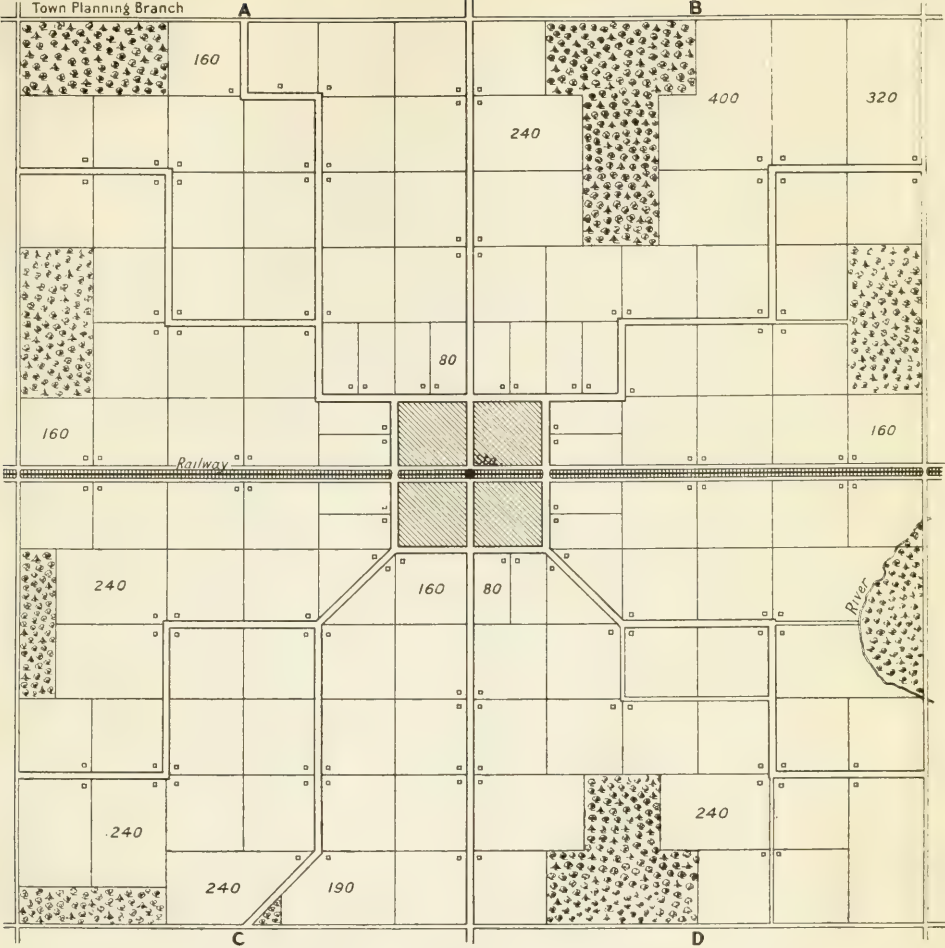
Ontario: A town planning report has been issued by a Citizens' Committee of Brantford. Visits, meetings and conferences have been held at Renfrew, New Liskeard, Toronto, Port Credit, Hamilton, Simcoe, St. Thomas, Blenheim, Windsor, Sarnia, Welland, Galt, Berlin and other towns.

A preliminary scheme has been suggested for Renfrew after a survey of the conditions. Good practical results are expected in the near future. My advice has been asked regarding plans of subdivisions which have been submitted to the Renfrew Council, and the amendments which I have suggested have been accepted by the Council and the owners. Reports on schemes for Port Credit, Simcoe and Blenheim have been made.

At Windsor a conference was held representative of the five adjacent towns which are together growing up into a great city opposite Detroit, namely, Windsor, Sandwich, Walkerville, Ford and Ojibway. It was decided at the conference that all these districts co-operate in a town planning scheme. The United States Steel Corporation has acquired 1,000 acres of land on which to

Commission of Conservation
 Town Planning Branch

Diagram 3



In this diagram it is assumed that the square form of land division for the separate farms must be adhered to as a condition precedent to the planning of the area. Varieties of size of holding from 80 acres (near the town) to 400 acres (remote from the town) are provided for, but all holdings could be made 160 acres if desired. A different plan is shown for each of the quarter sections, adaptable to the imaginary topography of the land, the only feature common to all the quarter sections being the main roads intersecting the township in two directions—one parallel with the railway and the other at right angles thereto. All the farms are grouped so as to give them convenient access to the town, where the same facilities are presumed to exist as are described in respect of Diagram 2. The total length of road usually provided in a fully developed township, not including boundary roads, is 60 miles. In this plan there are 36½ miles of principal and 3½ miles of secondary road, making a total of 40 miles. Every farm has sufficient road frontage, and the same length of boundary road is allowed for in both the above cases.

The object of these diagrams is not to suggest stereotyped or rigid forms of land division, but to show the desirability of abandoning such forms. Every township should be inspected and planned before settlement.



build the new town at Ojibway and has promised to co-operate in such a scheme. The Steel Corporation intends to make its part of the development a model of its kind. There we will have applied all the benefits of the experience gained in building towns in the United States, so as to make it a real model. I am hoping that the corporation will adopt the policy of limiting the profits which it may earn from the development of the town to five per cent, and give the rest for the benefit of the community.

At Hamilton the practical result so far has been to induce the corporation to appoint a Town Planning Commission and to supply it with funds to prepare a map of the city. I am assisting with that work and frequent visits to Hamilton are necessary. The crying need in Ontario is for legislation to enable cities and towns to make the work they are already doing really effective. Visits are to be made to Kenora, Port Arthur, London, Trenton and other towns from which invitations have been received.

Manitoba, Since last meeting I have visited Winnipeg, Regina, Saskatchewan and Alberta Swift Current, Medicine Hat, Calgary, Edmonton, Saskatoon, and other western cities, and conferred with local authorities and boards of trade. The results of the conferences are seen in the proposed consideration of legislation by the governments. We are in correspondence with some of these towns as regards partial schemes.

A visit has also been paid to Banff along with Mr. Harkin, Superintendent of Dominion Parks, and Dr. Deville, Surveyor General, and suggestions have been made with regard to its development.

British A report on the planning of Greater Vancouver and Columbia on the results of the competition for designing the Vancouver Civic Centre was issued during the year. An early visit to British Columbia will be necessary to advise regarding the planning of Central Park, the property of the Government.

HOUSING SURVEYS IN PROGRESS

During the year we have been considering the question of preparing suggestions for a Housing Act, to be submitted to the provinces. On going into the matter we felt the necessity of having a careful investigation made into the industrial, social and housing conditions of a particular city. For reasons of convenience Ottawa was chosen for this purpose. We started last summer and we hoped to have had the report ready for this meeting. It is a larger under-

taking, however, than we anticipated, and it may be three months yet before we are able to submit the results of the survey to the Commission. I feel sure it will be a valuable piece of work and will enable us to make practical suggestions for improving housing conditions.

EDUCATIONAL WORK OF TOWN PLANNING BRANCH

In describing local work I have given some idea of the widespread character of our educational work—the number of places in which conferences and meetings are held. These conferences, frequently represent large county areas or groups of towns. In connection with each a study is made of local conditions and frequently two meetings are held, one in the afternoon and another in the evening.

A large amount of literature is also distributed, including the quarterly bulletin, "*Conservation of Life*," which is familiar to you all. Maps, plans and books are being collected for exhibitions, and in a few places small exhibitions have been given.

Civic Improvement League	Our work has shown the necessity of having some voluntary organization formed throughout the Dominion to secure a more effective interest in civic affairs. The Civic Improvement League, formed for this purpose, has been successfully inaugurated and the report of the preliminary conference held on the 18th of November, 1915, has been published. Its first National Conference is to be opened by Field Marshal H.R.H. the Duke of Connaught on the 20th of January, 1915.* We have great expectations for the future of this League as a means of assisting us to educate public opinion.
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FUTURE WORK OF THE TOWN PLANNING BRANCH

With regard to the future we have ample scope for our energies in merely putting a finishing touch to work already begun. We must make an effort to secure the passing of legislation to deal with town planning in all the provinces. We must complete the housing survey of Ottawa and frame a draft Housing Act. We must continue to give advice to cities, towns and rural municipalities, wherever called upon, so far as this is possible within the time available. As a central bureau for information on civic improvement, including town planning, housing and public health, we must be prepared to be of service wherever required. It is hoped the Civic Improvement

* Separate reports of the two Civic Improvement League Conferences have been published and can be obtained on application to the Commission of Conservation.

League may help in some of the work of education we have undertaken in the past, but, on the other hand, it will probably increase the demands for our services in more important directions.

The work of the past year has been very encouraging, in spite of the distractions created by the war; in the coming year it is not likely to be less so. With the war on, it has been possible for us to cope with the public demand for help in civic improvement work, but had it not been for the war it would probably have been impossible to do so, except with a large staff.

**Departments of
Municipal
Affairs Urgently
Needed**

We urgently need the formation of Departments of Municipal Affairs in all the provinces to consider problems arising in connection with valuation of land, taxation and assessment. Reference to these matters was made in my last report, and what was then said still remains true, without any material improvement in the situation. It is understood, however, that the Ontario Government contemplates the creation of a Department of Municipal Affairs in the near future, and it is apparent the work of this Commission has not been without its influence in that direction.

During the year I have been consulted by the Toronto-Hamilton Highway Commission with regard to the construction of the road between Toronto and Hamilton, and have given evidence before and prepared a report for the Ontario Unemployment Commission.

I have attended the National Town Planning Conference at Detroit and the National Housing Conference at Minneapolis, and have also visited the city of Gary, Indiana, to make a study of its conditions, in view of the anticipated developments at Ojibway.

**United States
Requests for
Information**

It is an interesting feature of the correspondence of the branch that we have many requests for information from the United States, including requests for advice as to how they can accomplish what we are doing in Canada. We have been asked to furnish suggestions for an Act for Massachusetts similar to that passed in Nova Scotia. I hope we shall long be regarded by citizens of the United States and other countries, as an example worthy of being followed in regard to civic development and town planning.

DR. ROBERTSON: I was particularly impressed with the diagram (facing page 122) Mr. Adams showed, because, long ago some of us who believed that roads were not boundaries but means of getting to places, said you should not have roads all across the prairie

country where nobody wants to travel, and a prairie township as now laid out requires 70 miles of road, whereas, 29 miles would serve as well. Could not some of us older men get together and work more heartily and advantageously to make this Canada of ours more desirable to live in?

HON. GEORGE BROWN: The paper just read has taken up not only town-planning, but planning for larger towns, and that, of course, means greater agricultural development. We will not need much larger towns unless we have great agricultural development; that means the largest development, probably, in our western country. The problem we have to deal with there, in addition to town-planning, is the village and the small town that will give social advantages; that is of most importance in the west, and, if that is not a success, it will limit the success of the larger cities in the east. We have tried some things along those lines, and with different people. For instance, south of Regina a body of Hungarians and Russians settled around a flowing well in a part of the country where water is difficult to obtain. For some years the village had fifteen or sixteen families, but to-day, while most of the families are living in the neighbourhood, there is only one living in the village. Then we have the village of St. Justice, settled by kindred people (about thirty-five families) who came from the same country, under the direction of a parish priest who lent himself in every way to the project. The church was situated in the centre of the community. A ten-acre lot was given to each man, to establish his home, cultivate and to keep stock. Of the thirty-five families, very few are there to-day. They have moved out to their farms. There have been Belgian, Jewish and Scandinavian settlements, and, at the Grampian hills, a Scotch settlement. I do not think there is now one of the original settlers at the Grampian hills. In Benbecula, they have moved out on the farms and are now prosperous settlers, according to Father Gillies, who gave his life to the larger side of his work and to directing and aiding the people in their settlement.

That is the experience of the West during the last twenty-five years. There is no subject which lies nearer to my heart than that of trying to make the farm a place where a man will want to dwell, not a place he will be forced to leave. Dr. Robertson, to whom the West owes a great deal for the inspiration he has given to the people, will be surprised when I tell him about some of the well-known settlements, where the farmers came principally from eastern Canada, made good and left. About twenty-five years ago, when Dr. Robertson came to Regina, he went up north to the Rose Plain, the Condie and the Wascana settlements. The Wascana settlement was made



QUEBEC PARLIAMENT BUILDINGS

A narrow carriage drive suitable for a residential street. Better a well-paved narrow road than an unpaved wide road



SASKATCHEWAN PARLIAMENT BUILDINGS

Spaciousness around public buildings is as important as good design



up of farmers principally from around Cobourg, one of the best districts in eastern Ontario. Although it was one of the finest settlements in the west, only one of the original settlers remains, and he is a member of the Legislature. In the Rose Plain settlement, the old farmers are gone, not to the same extent, but there are not twenty-five per cent of the early settlers left in this settlement, one of the districts with churches, schools, railroads and markets. It is close to Regina and the soil cannot be surpassed in Canada for fertility. The same is true of the Condie district. As an indication of the value of Condie land, a settler who went in there in 1882 gave his farm to his son. For that 800-acre farm, with a house worth about \$3,200, neat buildings, and within a mile of a railway station, an American settler came over last year, offered him \$65 an acre, cash. If people leave settlements like that, you must account for it, you must cure the evil, or, whether we plan big cities in the east or west, or anywhere else in Canada, they cannot succeed.

About 1910, many people tried the community system. The map to which Mr. Adams referred looks first rate here, but no man can farm in Saskatchewan on 80 acres and be an enterprising citizen. He might live on it, but no community can succeed without leaders and enterprising citizens and men to whom the future holds out some measure of more than average success—whether they ever attain it or not. I farm 4,000 acres there, and have grown 32 crops. Though a lawyer, the farm enables me to understand the farmers' conditions. No section of that map could be well farmed, that is, for wheat growing, and wheat to-day is the only product we raise with a certainty of disposing of it.

We raise 50 per cent more cattle per capita than Ontario. I was surprised to find that Ontario had less than 930,000 head of cattle, other than milch cows, while the three western provinces, with a population of 1,450,000 people, had two-thirds as many. Ontario also had not much over 930,000 head of horses, while the western provinces have over 1,500,000. So you must not think we are not mixed farmers. But we must grow wheat because we cannot be sure of selling anything else. On 500 acres I grew a crop of oats two years ago, 70 bushels to the acre. I shipped them to the United States and sold them in Georgia for 50 cents a bushel, giving me 24½ cents net. I paid a duty of six cents per bushel—\$4.20 an acre, or five per cent on \$80 an acre. That is the handicap I had in getting my oats to market. Wheat has not that handicap.

Any man who farms less than 160 acres is not the kind of settler to make things move in that western country, because he makes only a bare living. The greatest success in Europe in the matter of

small farms is in Denmark, due to their co-operative methods of farming. The problem to-day in Canada is that we have an unorganized agricultural community, without leaders, and, where there is a man who could lead a village, he does not see any possibility of getting people together for co-operation in their work. He, therefore, goes to the big city, where he finds machinery for organized effort and industry and he makes money and a success. You cannot have any community in the west successful unless you have men who think and look further, and are broader in their vision, than the man who will settle down in a community on 80 acres.

MR. ADAMS: Only five per cent of the lots are 80 acres; the others are 160 acres.

HON. MR. BROWN: I am saying that you cannot do more than make a living in the west on 160 acres. Senator Edwards has said that the lumber trade is in a different position from others because lumber must be sold on a world market. Then think of the condition of a man on 160 acres. Everything he has to sell must be sold on a world market, while everything he uses he must buy in a protected market. A man can make money in that western country, but not on a half section at any great speed or even on a whole section very rapidly, and a man with brains enough to farm ten sections will make more money in some other business.

The best system of one hundred and sixty acre farms ever adopted was at Dunlevie, where settlers from Rumania were brought in. They settled on the corner sections of four farms, at every corner four families, within one hundred yards of each other. Then there were four more families a mile east, west and north—seventeen families within a mile of each other. It might be expected that agriculturists, from a country where they are accustomed to the community system, would make a success of such an allotment. Supposing that they had added to this the features of the map before us (facing page 122), and had run up half-mile diagonals, then, by putting in two miles of road, you would bring in 36 families. To show that this plan will not work in the West, I need only say that these men are all off those corners to-day. Most of them are on the farms yet, but at the old corners you find the ruins of some of the buildings which they put up.

THE CHAIRMAN (Senator Edwards): What is the reason for that?

HON. MR. BROWN: The reason is that in such a small community you cannot keep a big man and you have absentee landlordism in another form. They succeed in Scotland, because the tenant is a farmer, the man who owns the land is a land owner. The

land owner keeps track of his buildings, he plants flowers, keeps the hedges and farm in first class state and the buildings in repair. The tenant will not do it; so you have the landlord on the ground, and a good farmer willing to stay at home. Wherever you have that you have success.

I tell you that farming does not pay, and, when you get a man clever enough to make a living on a half section, he can go into town and make five times as much. How are we to cure it? Only, as I said before, if we manufacture everything any one can make for the farm. What are we? We are absentee landlords in another form. We tell the western farmer what kind of machinery to use, and what he must pay for it, and we have absentee landlordism there. What are you going to do to get around it? How are we going to work it for the benefit of all Canada? A clever man always makes money, by co-operation, just as in Denmark. In Prussia there are great land-holding peoples, but they have abused it and become the autocracy. They have also done so in Poland. In every country in Europe that has attained success you have co-operation.

You ask me if we have done anything in that line. There are 25,000 paid-up members of the Grain Growers Grain Co. in Saskatchewan. The Saskatchewan Co-operative Elevator Co. has between \$3,000,000 and \$4,000,000 to do business for the farmers and will buy 40,000,000 bushels of wheat this year. That is a movement of very great importance. It behooves the East and West to get together and work for the common good of the whole country.

Everybody says we are going to have a big immigration after the war. If I know the people of the United States, they do not like war taxes, and you will have difficulty in getting them to turn their faces this way. I know hundreds of men of the class one might expect to come from the United States. I have talked to other men engaged in the business of bringing them over and settling them. One man has 130,000 acres, which he expects to sell to American settlers. He says: "This idea of taxation is making our task almost impossible; where will we be after the war?" We say there will be a great immigration to the west. Is there going to be one? I do not know; you do not know; nobody knows. Just look at the situation. We will send 100,000 men from the Prairie Provinces to the war, and we are willing to do it and glad to do it. Whatever we do, we have to win; we will fix the rest after the war is over. But we are sending over 100,000 men, 80,000 of whom have already enlisted. We cannot expect to get more than 25,000 men from the cities and towns, which means 75,000 men from the farms. We have not 145,000 farmers in the three western provinces. If we

have not 145,000 farmers, it means that every other farm sends a man, and if you have your people on 160-acre farms, one-half the farms would be without anybody on them. In the three western provinces, a year ago to-day, we had 13,729,225 acres of land ready for crops. This year we have 5,417,283 acres less. The war is taking our men off the farms, and, when they return, we will first look after the men who went to the war. I do not think we will get a big immigration from the south, but we may. We will have a big influx of returned soldiers, whom we must look after. We do not want a great immigration of the kind of people—of whom we have 200,000 in the country to-day—who not only do not contribute anything to the war, but who have to be taken care of and looked after that they may not do us harm. We do not want to load up with that class. If you make the farming communities prosperous they will build the towns and cities. You can only make them prosperous by co-operation, as has been done in every country that has surmounted the difficulty. An organized body of men in any community can win against an unorganized body, so unorganized management will never produce leaders or big men, and you cannot have good towns, cities or villages in a purely agricultural country like the west unless the farmers are doing well.

The situation in our markets is very serious. About the last day of November, a friend of mine came in from the western part of the prairie that has not had a crop for two years previous to this year. He said: "I went twenty miles to see a farm down near Estevan. Two or three farmers had 100,000 bushels of threshed wheat lying on the ground without means to take it away—and they had not had a crop for two years." In Winnipeg, I asked a member of the Saskatchewan Government how things were out there. He said they were pretty good, but that there were many farmers in the new settlements who have 10,000 to 20,000 bushels of wheat, but have no money and cannot sell a bushel; and there are men who live within five or six miles of an elevator hauling their wheat forty miles to sell an odd load to get a little money. These conditions exist in the west. Under those conditions, how are we to draw population from the United States?

We are growing faster than any other part of North America at present, but the throwing of a lot of settlers into that western country, to burden municipalities and local governments, is a serious matter. We want to make conditions such that the farmer will be glad to stay on the farm. The farmer does not leave the farm because he wants to; he hates to leave it, and the one influence that to-day is driving the farmer from the farm is the farmer's wife. She says:

"Oh, we have made \$20,000 or \$10,000 through the increase in the price of land, and we have worked like slaves; we will go into the city." And they go into the city, and I do not blame the farmer's wife. We must make the conditions on the farm such that they will not want to leave it.

REV. DR. BRYCE: I suppose we have discussed this subject as long as time will permit. I know ex-Governor Brown's remarks are very much to the point, and I wish they would be considered by those who have listened to him. Of course, many have left settlements to go farther west and do better again, but in the main I quite agree with the Hon. Mr. Brown's remarks on this subject.

HON. SYDNEY FISHER: I was very much struck with what Mr. Adams said. It is largely on lines that have been occupying my own thoughts for some time. I look on town-planning as a matter that affects rural municipalities just as much as it affects the urban municipalities. We, in Canada, are municipally organized, both in country and in city, and any town-planning discussion or investigation ought to cover the plan of the rural municipality just as well and as fully as the city municipality.

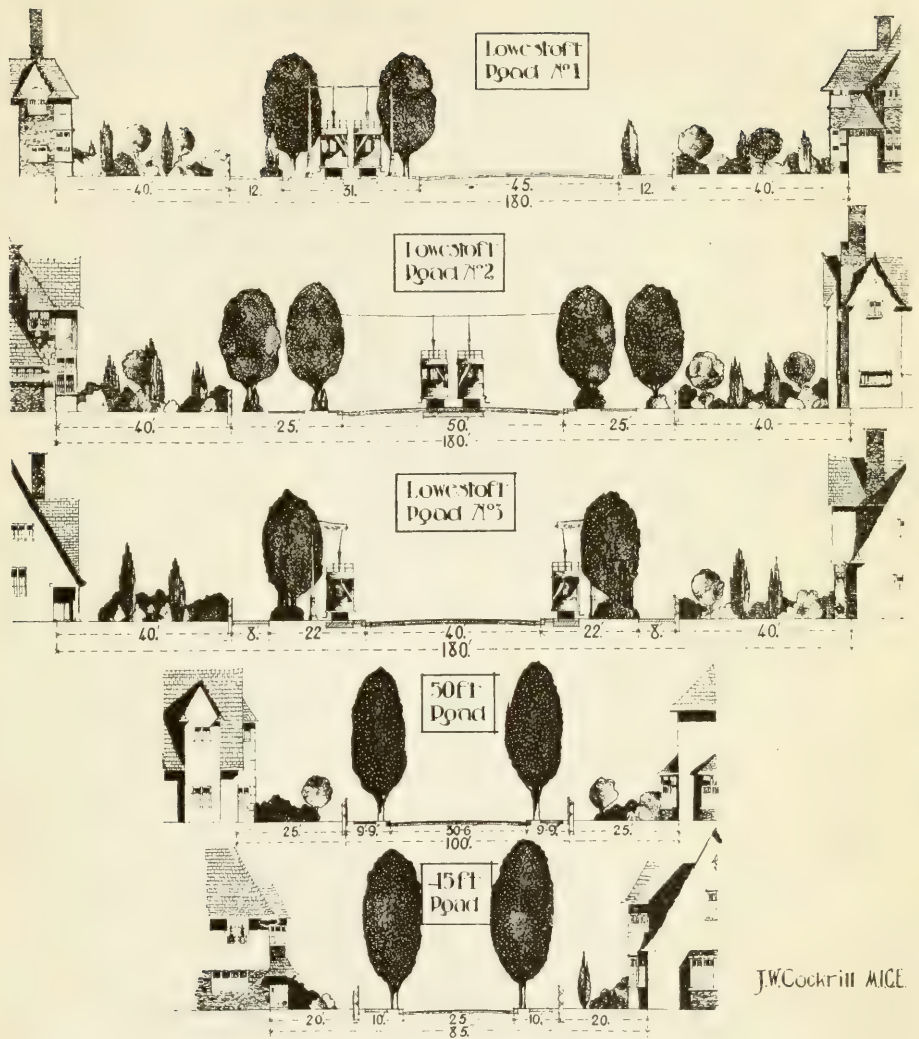
I thoroughly sympathize with Hon. Mr. Brown, in his view of the necessity of co-operation in all our rural developments. That has been conspicuously lacking but it is to-day the prime necessity for successful rural development. Mr. Brown pointed out that, in Denmark, the best specimens of development and progress were found. There, rural co-operation has been the foundation of their progress and their success, and we can find in that country a model we could study to great advantage.

It is evident that our present system of settlement and rural development in the west is a failure. Everything that Mr. Brown has said points to the fact that it is a failure. If it were not, we would not have had hundreds and thousands of men leaving the farms they had occupied. I shall not go into details, but there are other ways in which it has been a failure. Therefore, it is absolutely necessary for us to study some new system by which we can avoid the pitfalls of our farming methods, and by which we can secure that any immigration or any movement from the city to the land, or any return of the soldier population, may be placed in Canada on a successful footing, and not in as unsuccessful a condition as the farmers of the western settlements have been placed. I am not going into the reason for the lack of success of our farming system, but I do pray that the Commission of Conservation, and everybody who has an interest in the future of Canada, will try to work out a new system, avoiding the evil pitfalls, by which our rural

population may be increased, and our rural prosperity may be laid as a strong foundation to the prosperity of the whole country.

MR. SNOWBALL: This discussion is very interesting to me, coming from New Brunswick. I listened to Mr. Brown with interest, as I did to Mr. Adams. Mr. Brown treats the subject in the manner of a man who comes from a big country. In New Brunswick our people are well satisfied with a farm of 160 acres, but the conditions are different. The town-planning scheme mentioned would be admirably adapted to the new sections which are being opened up in New Brunswick. I can tell Hon. Mr. Brown that we are willing to pay, and are paying, this year, 65 and 60 cents a bushel for oats, and we have to bring them from his section to the lumbering sections of New Brunswick. We are paying \$15 and \$16 a ton for hay; in fact I have a contract with a farmer at \$18 a ton for all the hay on his farm. So that farming of that class will pay and the most successful farmer in our province to-day is not the man with 250 or 300 acres, but the man with 100 or 150 acres. I could name farmers near our town who are making money with less than 30 acres. They are farming intensively, going largely into the raising of vegetables and live stock and dairying; in that way they are building up the country. This is the class of farmers we wish to induce to come to New Brunswick after the war and to take up land. Our province is considering the matter of laying out sections, and I have been very much interested in what Mr. Adams has said. I shall bring it to the attention of the Hon. Mr. Murray and ask him to inaugurate such a plan in laying out sections, so that our people may have the advantage of easy access to the centre of population with their products and will thus be even more successful than they are at present. Unfortunately, many people who are taking up farms are getting too far away from the towns and are not making farming pay. Some of these people are leaving the farms. I might also add that we have now returning to New Brunswick men who sold good farms and went west because of the glamour of that country. On returning these men are buying back their old farms, satisfied to come to New Brunswick and farm there.

MR. ADAMS: I should like to say that this diagram is merely the shadow, and that the substance here is a matter on which we all agree, namely, that co-operation and concentration of this population is an essential. In my experience of agriculture I think the basis of co-operation is to have a definite plan for proper communication and transportation. The few cases here where there are farms of eighty acres are only by way of illustration. The question of the size of farm is only a matter of detail.



JW Cockrill MICE

GREAT YARMOUTH

The above road sections show the variation in the width of roads proposed to be permitted under the Town Planning scheme of Great Yarmouth in England. Roads No. 1, No. 2 and No. 3 are each 100 feet wide, and show alternative methods of dealing with a traffic thoroughfare having a street railway track. The building lines in each case are set back 40 feet from the street line, thus giving a total of 180 feet between the buildings. Two sections for residential streets are shown. In residential districts it is waste of space and money to make wide roads, where these are not required for through traffic. The above 45 feet and 50 feet roads are of ample width for average conditions, subject to the 20 feet or 25 feet set-back of the buildings.



Report on the Illustration Farms

BY

DR. JAMES W. ROBERTSON

Chairman, Committee on Lands

I PROPOSE to present only a brief statement of the general results obtained through the Illustration Farms, which were arranged for by the Committee on Lands of the Commission of Conservation, in the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island. It will not be practicable, within the time available on this occasion, to do more than indicate the main features of the progress and improvements which have been made. However, it will not be inappropriate for me to say now that visits to some of the Illustration Farms, examinations of the records in detail, and consideration of all the reports from the Illustration Farmers themselves, have given me great satisfaction. Of the many movements for the welfare of farmers, and the advancement of rural life generally, in which I have had the good fortune to take part, I do not recall any single undertaking which has been more entirely successful in accomplishing the objects aimed at than this one of the Illustration Farms of the Commission.

Result of
Survey of
Farms

The selection of the Illustration Farms and the work attempted on them grew out of the survey of farms conducted by our Committee on Lands in 1911-

1912. In the main the survey was undertaken to discover existing conditions as to:

- (a) The fertility of cultivated farm lands and its maintenance, increase or decrease as the case might be.
- (b) The prevalence of weeds.
- (c) The other hindrances to profitable and successful farming.
- (d) The methods and systems in use in carrying on farming practice effectively and satisfactorily.

In the provinces concerned 885 farms were surveyed. These farms were in groups of about 30 contiguous farms, and each group was chosen to represent a district of the province in which it was situated. A schedule was drawn up on which to record the information obtained by the visiting collector. The information thus sought and obtained uncovered many facts in regard to the systematic rotation of crops, the selection of seed grain, the sowing of clovers

and grasses, the care and use of manure, the prevalence of weeds, insects and diseases, the distribution of labour somewhat equitably over the whole year, and many other minor points.

Striking As a result of the survey many striking instances
Instances of of particularly good farming were brought to light.
Good Farming Some farms emerged from the level of the others,
not so much because of their better soil, as because of better plan-
ning, better system, better methods and, above all, better manage-
ment. From among the best of such farms in each group a selection
was made of one to become the Illustration Farm for the locality.
There were thus obtained, in the five provinces mentioned, twenty-
four Illustration Farms, located as follows:

Prince Edward Island:

J. M. McLean, New Perth, Kings county
Adam Brown, New Glasgow, Queens county
Albert Schurman, Central Bedeque, Prince county

Nova Scotia:

H. M. Tattrie, River John, Pictou county
Vernon B. Leonard, Central Clarence, Annapolis county
Taylor Bros. (J. G. Taylor and F. W. Taylor), Antigonish,
Antigonish county
Scott McDonnell, Port Hood, Inverness county *

New Brunswick:

Chester Keith, Corn Hill, Kings county
Kenneth Raymond, Bloomfield Station, Norton parish
Shaw Bros. (S. A. Shaw and F. N. Shaw), Victoria, Carleton
county
Fred Vautour, St. Louis, Kent county

Quebec :

John Chabot, St. Charles-de-Bellechasse, Bellechasse county
Adélarde Boily, Baie-St. Paul, Charlevoix county
J. A. McClary, Hillhurst, Compton county*
Ludger Cormier, L'Assomption, L'Assomption county†
Richard S. Pringle, Huntingdon, Huntingdon county†
L. R. Whitman, Knowlton, Brome county
Thomas McDowell, Shawville, Pontiac county

* Chosen in 1913.

† Did not complete three year term.

Ontario:

Whittiker Bros. (Conrad Whittiker), Williamsburg, Dundas county

Wm. T. Hands, Perth, Lanark county

Thomas Hall, Brooklin, Ontario county

George R. Barrie, Galt, Waterloo county

Paul Snider, Elmira, Waterloo county

A. M. Collver, Simcoe, Norfolk county

Nelson Peterson, Kingsville, Essex county

R. F. Taylor, Essex, Essex county

The survey established the fact that on these farms some measure of care and intelligence was used in the selection of seed grain and some system of rotation of crops was at least partially followed. On the farms so chosen more satisfactory results, on the whole, had been obtained in crops and in profits than on most of the other farms in the group.

**Method of
Selecting the
Farms**

The farmers themselves, of each group, in conference with the Commission's expert, chose the farms in their communities upon which they could have illustrations of further improved methods of farming. These, when proved to be beneficial, were to be applied to all the farms in their districts. The Illustration Farmer, thus chosen, received no salary. He did not become the beneficiary of the public through political patronage; but, by the choice of his neighbours, he became their leader, whom they would willingly follow. They did not need to follow his vagaries, if he had any, in regard to philosophy, theology or politics. It was not necessary to consult church or party in selecting the Illustration Farmer. He retained his ownership and full control of his farm. At the same time he received counsel as to systems of rotation and methods of cultivation, the selection of seed, the growing of clovers and grasses, etc.; but the general administration of the business affairs of the farm was controlled entirely by the Illustration Farmer himself. He received all the financial returns resulting from the better crops. The illustrations benefited the community also. The arrangement with each Illustration Farmer was to last until he had harvested three crops. By the end of the third year, that is, at the end of the season of 1915, we were entitled to learn from the farmer his opinions and conclusions as to whether the plan had worked out satisfactorily.

**Co-operation
Between
Farmers and
Commission**

After all, in an enterprise such as the Illustration Farms, the first test of success is: "Does it pay?" It is not, "Does it sound well, look well, and conform to certain theoretical principles?" but, "Does it pay?" Does

it pay in crops and profits? Does it pay in the resultant fertility of the farmer's fields according to the farmer's own estimate? Has the plan resulted in the decrease of weeds and in putting them under control? Has the farmer been shown how to apply labour to more advantage and has he been able to secure enough labour of the right kind? The answers to these questions can best be given by the farmers themselves. There has been keen and cordial co-operation between the Illustration Farmers and the Commission; there has been confidence on their part and great expectation of benefit.

**Cost of
Carrying out
the Plan**

The Illustration Farmers were directed, or rather assisted, by expert counsel from the Committee on Lands for two years, taking in the crops of 1913 and 1914. I have already said, the Illustration Farmers did not receive any salary. However, in order that results might be reached without unnecessary loss of time, the Committee decided to grant a limited amount of assistance to each farmer to provide (1) a supply of seed grain of suitable varieties and of selected quality, (2) the quantities of clover and grass seeds recommended above those required at the rates per acre previously sown, (3) trials, on limited areas, of after-harvest cultivation, seeds, manures, etc. These costs amounted, on the average, to \$78 per farm per annum. The cost for salaries and travelling expenses of the Commission's advisers amounted, on the average, to \$165 per farm per annum. The expense of initiating the undertaking and getting the work started was more per farm than it need be hereafter now that information has been obtained as to what is necessary and advantageous.

In the spring of 1915 the place of the Committee on Lands, in carrying out the arrangements made for the three year period of 1913-1915, was taken by the Dominion Department of Agriculture, through the Division of Illustration Stations of the Experimental Farms. The Committee on Lands released Mr. John Fixter, who had been travelling instructor for the Illustration Farms, to accept a position in that division.

The Agriculturist of the Commission visited each of the Illustration Farms once during the season of 1915. Full reports of the results of the season's work have been received from the farmers themselves and by the kindness of the Director of the Experimental Farms.

**Plan to Suit
Individual
Farms**

The plan of work for each farm was made to suit its conditions. The plan was made by the Illustration Farmer himself, in each case after conference with the Commission's advisers. The frequent visits made by the

Commission's advisers assisted the farmer to modify the general plan of work and the methods of its application from time to time.

In general the scheme of co-operation between the advisers and the farmer included consideration of the following matters:

The planning, commencing and carrying on of a suitable systematic rotation of crops for each farm and its neighbourhood.

The sowing of the varieties and strains of grain suitable to the farm and the district.

Different rates per acre to ascertain the most suitable rate of seeding.

The sowing of different amounts per acre of clover and grass seed, to ascertain the most suitable rate of seeding of both home grown and purchased seed.

The sowing of various summer pasture mixtures.

The practising of after-harvest cultivation, extra and more thorough cultivation to kill weeds, conserve moisture and increase yields.

The introduction of labour-saving devices and up-to-date machinery.

The care and economical use of farm-yard manure.

The encouragement of a farm garden.

Directly and indirectly encouraging many other means to make the farm more profitable, the farm life more satisfactory and pleasant, and to help to keep the young people on the farms.

This report considers the work done on the Illustration Farms in Ontario, Quebec and the Maritime Provinces. The farms of the Prairie Provinces and British Columbia have their own peculiar conditions, which are not fully covered by the above headings. They are not dealt with on this occasion.

Statements have been received from twenty-three out of the twenty-four farmers in the eastern provinces who were doing illustration work. The results now given are those from a total number of twenty-three Illustration Farms.

Advance in Crop Rotation	Twenty state they are now practising a more suitable and systematic rotation than they did before commencing work with the Commission three years ago. Seventeen report having changed the plan of their farms or fields, to some extent, to enable them to more advantageously practise the rotations advised by the Commission's instructor.
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Three farmers are not practising a more suitable and satisfactory rotation than previously. The reasons are as follows:

Nelson Peterson, Kingsville, Ont., had already been following a three year rotation, has continued it, and it has proven a great success.

George R. Barrie, Galt, Ont., has been practising a systematic rotation for the last fifteen years and is continuing the rotation which he found to be suitable.

Kenneth Raymond, Bloomfield Station, N.B., has a small portion of his farm devoted to cereal crops and roots, while a large portion of the farm is on the river flat, which is given up to the growing of hay. The same rotation which has been practised on the cultivated portion is still being continued.

Every farmer who has improved his rotation system says that it has increased his crop yields. Several state that there has been an increase but cannot say how much, while twelve state a definite increase, the average of which is 19 per cent.

Twenty-one state their farms are more fertile and freer from weeds than before, while twenty-two say that the following of a definite plan makes their work more profitable and also much more interesting.

The following extracts from the Illustration Farmers' reports indicate the extent of the resultant increase in the yields of crops per acre. And please bear in mind that at the beginning of this work these farmers were already among the very best in their localities.

Paul Snider (Elmira, Ont.): Increase from 5 to 10 per cent.

W. T. Hands (Perth, Ont.): We find the work more interesting, instructive and profitable.

Thomas McDowell (Shawville, P.Q.): Increase 20 per cent.

J. A. McClary (Hillhurst, P.Q.): Increase 15 per cent.

Adelard Boily (Baie-St. Paul, P.Q.): I am certainly practising a more suitable rotation than I did three years ago. I divided my farm in such a way as to make it easier to practise this rotation. My farm is freer from weeds and my crop yield is increased by 20 per cent. During the past three years your demonstrator's advice has been of immense service to my neighbours and to myself.

Chester H. Keith (Corn Hill, N.B.): Increase 33 per cent.

Fred Vautour (St. Louis, N.B.): I can plan my work better than before. My farm profits are about 30 per cent better.

H. M. Tattrie (River John, N.S.): Increase 20 per cent. The increase in crop yield has been largely due to the amount of couch grass we have killed.

Taylor Bros. (Antigonish, N.S.): Farm profits are much greater than before.

Scott McDonnell (Port Hood, N.S.): Increase 25 per cent.

Albert Schurman (Central Bedeque, P.E.I.): Increase 10 to 20 per cent. The time has been rather short (three years) to see the best results.

Adam Brown (New Glasgow, P.E.I.): Increase 10 per cent.

**Varieties of
Grain Sown**

Sixteen of the men stated that they had not been sowing the varieties and strains of grain on their farms to give best results, and eighteen say they are now sowing varieties more suitable to their farms and their neighbourhood.

Only three claim to have been sowing selected seed before beginning work with the Commission, while now every man is sowing selected or registered seed, and they state that it pays them in bigger and better crops. All of the men say that good seed has become something of much greater importance to them than previously. This is something which cannot fail to have lasting and far-reaching results in each community. From the many expressions of opinion by the Illustration Farmers, the following may be quoted:

Nelson Peterson (Kingsville, Ont.): Three years ago I thought I was sowing good seed; now I find it pays to sow the best that can be had.

R. F. Taylor (Essex P.O., Ont.): Some grains we have better.

George R. Barrie (Galt, Ont.): As to Indian corn, it is cheaper to pay \$10.00 per bushel for good kiln-dried corn than to sow the shelled corn that is sold in the stores. Two acres sown with selected corn, purchased on the cob, costing \$2.50 to \$3.00 per bushel, gave almost twice as much weight of ensilage as two acres sown with shelled corn in sacks and costing about \$1.50 per bushel.

W. T. Hands (Perth, Ont.): We have not changed varieties of seed, but we are now sowing nothing but registered seed. We find we have better results and that it pays. Last spring we sold about 400 bushels of oats at \$1.25 per bushel and 200 bushels of barley at \$1.00 and \$1.25 per bushel.

Whittiker Brothers (Williamsburg, Ont.): The tests with corn have proven to us that it is cheapest to buy the best seed corn possible; it matters not what the price may be.

Chester H. Keith (Corn Hill, N.B.): I am now sowing the best of seed, whereas I used to sow seed of inferior quality. This is one way the Commission of Conservation has helped, not only me, but a number of neighbours, in obtaining good seed grain.

Taylor Brothers (Antigonish, N.S.): We have been sowing selected seed for the past eight or ten years; on the average our yields have been fully 50 per cent greater than they were before.

**Rate of
Seeding for
Best Results**

The question of the amount of grain to sow per acre to get best results had not received much attention by the farmers, and many did not consider the condition of the soil when determining the amount. Thirteen state they now know that the amount sown previously was not suitable,

and have changed their rate of seeding. Every farmer says he has found that cleaned and selected seed does not require to be sown so thickly as uncleaned seed, and that soil conditions should determine to a considerable extent the amount per acre to be sown. A number had previously given this point indifferent consideration, but ten stated that they had not thought of this at all previous to the visits of the Commission's travelling instructor.

George R. Barrie (Galt, Ont.): We have found that the richer the land the smaller is the quantity of seed needed, and where the land is poorer a heavier seeding is needed. We formerly seeded it all the same.

**Sowing of
Clover Seed** Only two of the farmers claimed to have been sowing their clover seed thick enough to ensure a good catch. Twenty-one had been sowing an average amount of six pounds to the acre, whereas they now sow ten pounds to the acre. Some had sown as low as three or four pounds, but are now convinced that ten pounds is better and are sowing it. Three farmers had previously grown their own seed while now twelve are regularly doing so.

George R. Barrie (Galt, Ont.): The high price of clover seed had something to do with our sowing a small amount, but since growing our own seed we do not mind sowing it heavier and find that the extra seeding more than pays for itself.

Another farmer, who had not previously grown his own seed, states that in 1914 he produced 500 pounds of alsike seed and 100 pounds of red clover, while in 1915, he grew over 1,000 pounds of red clover seed. The farmer doing illustration work for the Commission in Lanark county, Ont., in 1914, grew 1,200 pounds of red clover seed and had never grown a pound of his own seed previous to commencing work with the Commission.

J. M. McLean (New Perth, P.E.I.): During the last two years the first crop of hay was always much better on the area sown with 10 lbs. clover and 10 lbs. timothy, while this year we have an unusual stand of clover in the plots heavily seeded. * * * We find the second crop is always much thicker and of a better quality after the thick seeding.

**Summer
Pastures are
Help in Feeding** Only three of the farmers had previously sown summer pasture mixtures, while thirteen now make a practice of sowing a piece for summer pasture, and all state that it pays to do so.

George R. Barrie (Galt, Ont.) says: The summer pastures are a great help in feeding the cattle during the months of



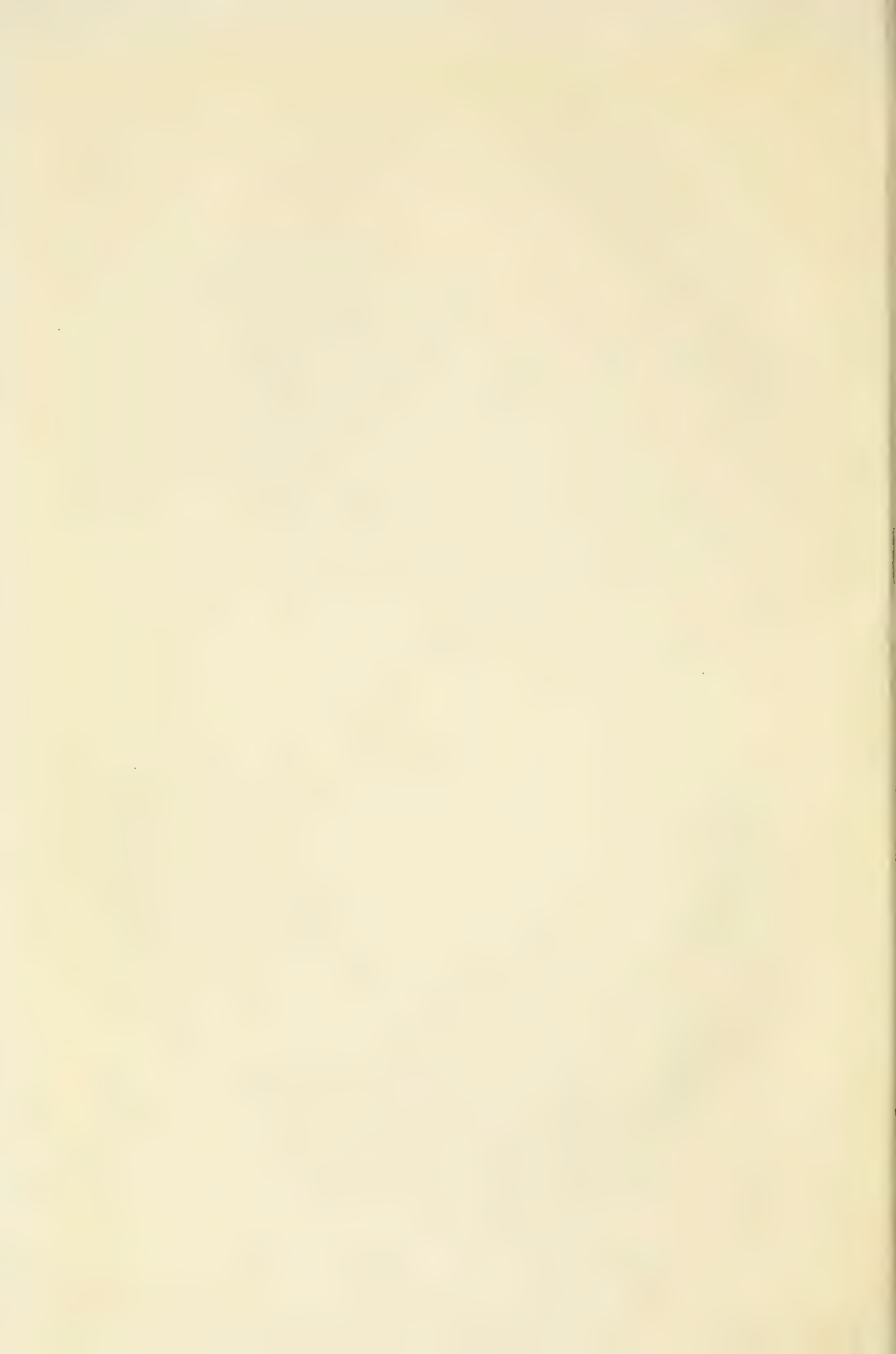
CLOVER ENRICHES THE SOIL

The corn on the left was planted on land on which corn was grown the previous year; that on the right was planted on land which grew a clover crop the year before



THE HOE CROP IN THE ROTATION

Turnip and potato crop on a Prince Edward Island Illustration Farm; this splendid crop is the result of good cultivation and care



July and August, and the land is greatly enriched for the next crop.

Vernon B. Leonard (Central Clarence, N.S.): I tried the summer pasture mixture last year and will try it again next year. I believe it an excellent way to carry stock through the dry season when pastures are short. I think the farmers of this country should practise this plan.

**After-Harvest
Cultivation**

Five of the farmers had been practising after-harvest cultivation previous to the visits of the Commission's instructor, while since his visits twenty have been practising it. Eighteen state that it has helped to keep down weeds, and that it has increased their yields and the profits from their farms. Some of their statements follow:

George R. Barrie (Galt, Ont.): Our experience with after-harvest cultivation has proven to us that it helps greatly in keeping down weeds and the land is in a better condition to withstand the drought the next year.

W. T. Hands (Perth, Ont.): Following clover seed production and seeding, this is, in my opinion, the next most important illustration. We find it pays from every standpoint and, as proof that this part of the work has been noticed, many of the farmers in this district are demonstrating its value for themselves and the acreage is yearly increasing. Three years ago this was not done.

Thomas Hall (Brooklin, Ont.): If one wants good crops he has to gang plough and cultivate after the harvest.

Thos. McDowell (Shawville, P.Q.): After-harvest cultivation was not practised in this community until three years ago; and now many farmers are doing quite a lot of it, and find it very profitable, for it mostly ensures a good catch of grass and clover, leaving the land porous and fertile.

Albert Schurman (Central Bedeque, P.E.I.): I notice a good many of my neighbours are taking up this practice.

**Labour and
Time-saving
Devices**

Eighteen of the farmers say they are making more use of labour and time-saving devices than before; fourteen are using wider implements; twelve are making more use of three and four-horse teams, while twenty state that they now plan and adjust their farm work to better utilize the help on the farm than they did before. Some of their statements are:

Nelson Peterson (Kingsville, Ont.): Having used a three-horse team I find that it is a decided advantage.

George R. Barrie (Galt, Ont.): We have arranged our work so as to be able to employ all our help by the year.

L. R. Whitman (Knowlton, P.Q.): We find that up-to-date and improved machinery and methods are profitable in all ways.

Adélard Boily (Baie-St. Paul, P.Q.): When I have to renew my implements I get wider ones, for I think the wide implements are more successful.

**Application of
Manure**

Fifteen of the farmers state that they are now applying their farm manure in a manner to get better results than previously. Eighteen of the farmers are now exercising more care to prevent waste. Twenty state that they recognize more fully the value of the manure than they did before the visits of the Commission's instructor.

W. T. Hands (Perth, Ont.): For the last two years we have been trying different methods of applying the manure and find it very interesting. We will have to continue for a few years yet to find out which is the best way, as I believe the seasons have much to do with it.

Adelard Boily (Baie St. Paul, P.Q.): I am exercising care to prevent waste and I appreciate more the value of it.

**Farm Gardens
Receive more
Attention**

Twelve of the farmers stated they had always paid some attention to the garden, but eighteen say they are now paying more attention to the farm garden and find it pays them to do so.

George R. Barrie (Galt, Ont.): We have always kept a good garden, but we are now paying more attention to the securing of better varieties of seeds and plants.

John Chabot (St. Charles-de-Bellechasse, P.Q.): I find the young people taking an interest in and enjoying the farm work more since the garden has been improved.

Adelard Boily (Baie-St. Paul, P.Q.)—The garden is the place where we train the young people to work on the farm and to enjoy it.

**Increasing the
Attraction of
the Farm**

Twenty-two of the farmers say they are now taking more interest in their farm work generally than before. Seventeen say their young people have become much more interested. Every man states he is convinced that it is necessary for him to try things on his own farm to see what is really suitable to his farm and community. Twenty-two of the farmers state that their farm profits generally are greater than before.

George R. Barrie (Galt, Ont.): The satisfaction of trying things out for yourself, and seeing results, is bound to increase a person's interest in his work, and the illustration work conducted by the Commission on our farm has shown us what can be done.

Thomas Hall (Brooklin, Ont.): While we have been working under the Commission we have found it a great pleasure to try out these illustrations, and the young people have taken more interest in the work on the farm.

W. T. Hands (Perth, Ont.): We find as the years pass the work more interesting and instructive; and believe that it has been productive of great good throughout the surrounding country. Besides scores of farmers have made enquiries and are deeply interested in clover seed production and seeding, which is also practically a new thing in this part of the country.

Thomas McDowell (Shawville, P.Q.): The illustration work on the field at the road has called forth the attention of the community at large, and it has proved to them, as well as to ourselves, that a four-year rotation is a very profitable one. They stop to enquire how it has been worked and seeded and are trying to copy it as far as possible.

Adelard Boily (Baie St. Paul, P.Q.): During the past summer I observed that the public was very much interested in your Illustration Farms. I received many visitors and I noticed that my illustrations were profitable to all.

Fred Vautour (St. Louis, N.B.): I am more attentive to my work in every way. The young people have a garden of their own. My farm profits are about 30 per cent better.

Chester H. Keith (Corn Hill, N.B.): The illustration work done here is bringing good results in many ways. The farmers are sowing much more clover seed, and, instead of getting the cheaper grades, they are now buying the best. A number of farmers were quick to take advantage of the chance to get good seed grain which had been grown from registered stock. A number of farmers are doing after-harvest cultivation, something that had not been practised around here before. I find that what suits one community does not always suit another. I believe you have to find out, by trying, what is best suited for your own farm and the community in which you live, but I must say that in almost every case where we have followed the advice given by the instructor sent out by the Commission, things have worked out wonderfully well.

Vernon B. Leonard (Central Clarence, N.S.): I am fully persuaded that the work of the Commission has been a good thing for me. I have learned many valuable lessons, and I believe my neighbours have benefited to some extent too.

Albert Schurman (Central Bedeque, P.E.I.): Results: better seed, better cultivation and better prices from having a good article to offer.

Suggestions
for the
Future

The extracts I have quoted fairly represent what has been accomplished. At the same time I must say that, because of the necessary brevity of this statement, they do not present a complete summary of all the benefits that have been gained by the Illustration Farmers, by other farmers in their neighbourhood and by the Commission of Conservation itself. Now that the work of the three-year period has been

completed, how can the very best service be continued by these Illustration Farmers, through the experience they have acquired during the three years that they have been assisted by expert counsel from the Committee on Lands or from the Dept. of Agriculture? It would be entirely contrary to the principles of conservation to lose from public service such power as they now possess, such information as has been gained, and such opportunity as now exists, without at least an effort to continue, and, if possible, improve the good results from them.

In the first place, the thanks of the Commission are due to each of these Illustration Farmers for the very valuable service which they have rendered. In the second place, the Commission should do what it can to cause the farmers themselves and their neighbours to conserve the benefits which they have so far derived. One need not repeat here that conservation itself, in its ultimate analysis, means putting the person, thing or idea to the best use for the present and leaving them all in the best relations for the public good and individual welfare for the future. So now I propose that these farmers be encouraged to form an Illustration Farmers' Association. The chief objects would be:

(a). The mutual benefit of Illustration Farmers, by exchange of information, by discussion of plans, by comparisons of results obtained and by occasional visits to each others farms.

(b). The benefit of their neighbours, through meetings of Neighbourhood Improvement Associations on their farms, and by other means.

(c) The advancement of agriculture generally, through the publication of reports of their progress as Illustration Farmers from time to time.

**Continuation
of Movement**

Thus this movement, so happily and successfully inaugurated by the Commission of Conservation, may be continued on and through these particular farms on which it had its beginning. No doubt some form of Illustration Farms will become common throughout the whole Dominion. It seems to me that the time need not be far distant when there will be one or more such Illustration Farms in every county. In future, there may be some modification or alteration of the arrangements which have obtained between the assisting public authority and the individual Illustration Farmer. I consider it important that certain principles should be adhered to. These include co-operation between the Illustration Farmer and trained competent counsellors, freedom of administration by the Illustration Farmer for his own profit, and the adoption of plans or methods only so far as his judgment approves

after taking into account his resources and the need for making them pay.

The benefits from such farms would be incalculable, while their costs to the public, through either county, provincial or Dominion supervision, would be a very small sum. Perhaps no other field of opportunity offers such fine returns in material profits, useful knowledge and development of individual ability, satisfaction and good will.

DR. BRYCE: As a member of the Committee on Lands I was very much interested in this report. There is one important problem which I wish to bring before the Commission; that is the very great prevalence of weeds in the west. It is a tremendous question, and something must be done. I should like to appeal to the Commission for assistance, to help us do something to remedy this evil, to give us advice and help us in this enormous question, because it has assumed such a position in the last three years as to become alarming. That is the feeling particularly in Manitoba. Manitoba is the oldest western province. When I went there forty-two years ago, it had only one or two weeds. One was the French weed and the other the common mustard that you see all over Canada. Since that time, by the increase of population, and the bringing in of dirty seed, some even from Russia, we have now, instead of that one single mustard, eleven different kinds of mustard that are dangerous to the crop. They come into the country in seed. We have also had, in the last twenty-three years, some alarming developments in connection with the thistle. A few years ago the Russian thistle was troublesome, but it was stamped out. Now the sow thistle, which is the most dangerous of all, is quite common. There is one in the office of the Minister of Agriculture in Winnipeg which I am sure is eight feet high. This question is appealing to us as very few other things have done. We have a good many things that trouble us, but the sow thistle is one of the most important. The government of the province intends to bring in a new bill relating to the destruction of weeds. The difficulty is to get the farmers to cut down the weeds and make an effort to destroy them. The new bill that has been brought in by the Minister of Agriculture is intended to enforce the destruction of weeds. An inspector will go over the farms and tax those that are very bad in weeds. This tax will stand against the land. After this the farmer himself will be given an opportunity to cut them down and he will then be freed from his tax. If he does not cut them down the government's agent will cut down the weeds and

the tax will be collected from the property to pay for it. These are the general provisions of the new Weeds Act now being introduced in the Manitoba Legislature.

I feel that so much has been done by this Commission in connection with the different departments taken up that my appeal for help will not be in vain. Agriculture is the great industry of the west. The three Prairie Provinces have only this to depend on, and the worst enemy we have at the present time is the many kinds of weeds that come in from all over the world in seeds and are now growing up. These are a thorough menace to the country. I should like to appeal to the Commission to have them take this question up, that something may be done, if possible, in backing up the western provinces in their efforts to overcome this trouble before it is too late. After all, it seems to be largely a matter of education of the farmer, and I feel that this matter might well be left to the committee with instructions to them to prepare a resolution.

HON. MR. BROWN: The Minister of Agriculture in Saskatchewan, a practical farmer himself, states that the loss in our province from weeds is from \$25,000,000 to \$30,000,000 a year. These have practically all come in within the last five or six years.

THE CHAIRMAN (Senator Edwards): Has not continuous grain growing something to do with it?

HON. MR. BROWN: No, it is the continuous importation of unclean seed. For instance, the whole country is covered with French weed, originally brought from Germany and planted at Morrisburg, and thence taken by early French settlers to the Red River valley. The weed flourished there, and when the Red river overflowed its banks, the whole country was planted. A more dangerous weed is the sow thistle. It is almost impossible to kill it. J. J. Hill, of the Great Northern railway, who has probably given more scientific and well-directed attention to the problems of the northwest than any other man, has devoted special attention to this weed. He has taken the best men from the universities for experimenting. As a result of his work a new machine has been designed which will eradicate the sow thistle. It is a plough, which picks up the soil to a depth of from fourteen to eighteen inches, throws it into a drum, then throws it out on the ground and the weeds fall on the top. But the machine is patented and is sold for \$3,200, or \$20 an acre on a quarter section. It will cover about seven acres a day. I have the information from Sheriff Cook, of Regina, who interviewed Mr. Hill, that it would be possible to build this machine for something under \$800. He said to the manufacturers: "Can you not manufacture this and sell it to the farmer for \$1,200 or \$1,250,

because he cannot buy it and add \$20 an acre to the expense of his farm?" They said: "No, we have a patent." Mr. Hill has asked the United States Government to make a change in the patent laws, so that when a man discovers anything he shall have a royalty on everything made under that patent but everybody shall have the privilege of manufacturing the article on payment of the royalty. I understand Mr. Hill will also ask the Canadian Government if it is not possible, in connection with machines which are essential to the country, to provide that a man can only collect a reasonable royalty.

I do not think it possible to eradicate either the French weed or the sow thistle, except by improved methods of farming. Our seeds are being brought into that country by people from other lands. They bring in seed and plant some new kind of weed with the grain, and we have a new weed. Last year a man brought in four carloads from Turkestan—we have now all the weeds of Turkestan. So, if this Commission can do anything by which the country can be protected against the production of weeds it will be a great advantage. The cutting of the weeds is most essential. We have provision now by which the weeds on a man's property can be cut and he can be charged with the expense of cutting them. I think the worst thistle patch in all Saskatchewan is within a mile of the office of the Department of Agriculture, in one of the old annexes of Regina. This property was successfully farmed for years, but now it is green with Canadian thistles. You can plow as deep as you like but, owing to its depth in the soil, it will grow quickly. The soil, of course, is very deep, and the fertility seems to continue to quite a depth, that is, if the lower soil has been exposed to the air. I know farmers who have been growing crops for twenty years, and all the manure from the farm is being burned, because the farmers would rather burn the manure than run the risk of spreading the weeds contained in it.

HON. SYDNEY FISHER: If the farmers of the west have got certain weeds from the east, they have retaliated by sending us a lot in the last few years. The sow thistle is known in Quebec. The tumble weed has appeared. Both of these came in grain brought from the west. We think the problem is not only in the west—although it is worse there than in the east—and it is an evidence of bad farming in Canada, which we have got to reform.

Report of the Committee on Lands

BY

F. C. NUNNICK

Agriculturist, Commission of Conservation

AN outline of the work of the Committee on Lands for 1915 is as follows:

1. The conducting of an agricultural survey for the purpose of collecting information required by the Committee on Lands to complete plans for future work proposed at the last annual meeting.
2. Visiting the Illustration Farms, for the purpose of observing the progress of the work and making a final report upon the benefits to be derived from work of this nature.
3. Addressing agricultural meetings.
4. Preparation of press bulletins and articles for *Conservation*.

Meetings

The agriculturist addressed thirty-two meetings during the year. Twenty-two of these were in connection with the Patriotism and Production Campaign of the Dominion Department of Agriculture. The travelling instructor of the Committee on Lands addressed ten farmers' meetings and twenty-two meetings in connection with the Patriotism and Production campaign.

Report on Illustration Farms

During July, August and September, 1915, the agriculturist visited the Illustration Farms in the Maritime Provinces, Quebec, Ontario and Manitoba, for the purpose of observing the results of the illustration work and conferring with the farmers regarding the benefits obtained therefrom.

The Illustration Farm work was transferred to the Dominion Department of Agriculture in the spring of 1915, at which time a new division was organized, known as the Division of Illustration Stations, with headquarters at the Central Experimental Farm Ottawa. The illustration work has been considerably extended during the past summer by the Division of Illustration Stations. Fifteen new stations have been started in each of the provinces of Alberta and Saskatchewan, with nine in Quebec.

AGRICULTURAL SURVEY, 1915

At the last annual meeting of the Commission of Conservation, the Chairman of the Committee on Lands, in his address, suggested as one line of future work of the Committee, an Illustration County, after the plan of our Illustration Farms. During the summer of 1915 a survey of 100 farms in each of four different counties in Ontario was conducted, to obtain such further information as would assist the Committee on Lands in making a choice of a district and in laying plans which would later be carried out in the district chosen. The four counties visited were Dundas, Waterloo, Northumberland and Carleton. One man, a graduate of the Ontario Agricultural College, did the field work in connection with the survey, and, from his personal observation, combined with the testimony of the farmers, the desired information has been secured. The survey included the following:

1. An investigation of areas under crops, crops grown, untillable areas, uncultivated tillable areas, and types of soil.
2. An investigation of crop rotations, seed selection, varieties of seed used, clover seed growing, areas seeded to clover and alfalfa, amounts of seed sown per acre, comparison of crop yields with ten and twenty years ago, and the production, care and uses of manures and fertilizers.
3. An investigation of weed pests, insect pests and plant diseases.
4. The obtaining of information regarding the small fruits grown on farms, the number of farm gardens, the fuel supply, forest planting, number of live stock kept, and diseases among stock.
5. An investigation of the labour supply on farms, labour saving devices, water supply, conveniences in farm homes, and the heating and lighting systems.
6. The obtaining of information regarding co-operation among farmers in buying and selling, roads, transportation, education, short courses, the use of government bulletins and agricultural papers.
7. An investigation of rural social conditions. Attention has been paid to the community events attended by the farmer and his family, neighbourhood playgrounds, musical instruments, telephones, horse and buggy, clubs, home grounds and other phases of this question.

The following are some of the facts revealed by the survey:

Crop Rotation Forty-four per cent of all the farmers visited claim to be following a systematic rotation. In Northumberland and Waterloo counties crop rotation seems to be fairly well understood and is quite generally followed. It is doubtful if a regular rotation is as closely followed in Dundas county as the figures in the table of results indicate, as further questioning revealed a tendency for various reasons to depart from the rotation. In Carleton only 20 per cent claim to follow a systematic rotation.

Seed Ninety-one per cent of the farmers visited use seed grown on their own farms, but buy or exchange their grain for seed once in four or five years. Only one per cent claimed to be practising a systematic selection. Fifty-seven per cent keep the grain from the best part of their fields for seed. Practically all of the farmers visited clean their seed; only five per cent were found to be treating their seed for smut. Twenty per cent of all the farmers visited did not know the name of any variety of the grain being sown. In Dundas 56 out of 97 farmers growing oats did not know the name of the variety, and 75 out of 86 who grew barley did not know the name of the variety grown.

Yields In Dundas county it seems to be the general opinion that the hay crop is not so good as 10 or 20 years ago, and in all the counties the opinion seems to be that grain crops are about the same as ten or twenty years ago. It is difficult to obtain accurate figures regarding this, as very few farmers keep an accurate record of yields.

Manures Six farmers only claimed to be saving all of the liquid manure. Seventy-seven per cent exercised no special care to prevent waste of the manure. Seventeen per cent have manure sheds. Aside from these sheds very little care was being exercised in preventing waste.

Weeds The five worst weeds mentioned by the farmers were Canada thistle, couch grass, wild mustard, ragweed and sow thistle. Many others were seen, but these five stand out as being exceptionally bad. In many cases they are reported as increasing. In Dundas 98 per cent report wild mustard, and 88 per cent report sow thistle, with 26 per cent reporting it as increasing. In Waterloo 82 per cent report ragweed, with 34 per cent reporting it as increasing, and 78 per cent report sow thistle with 24 per cent reporting it as increasing. In Northumberland 85 per cent report Canada thistle, 82 per cent couch grass, and 61 per cent wild mustard, with 25 per cent increasing. In Carleton

89 per cent report couch grass and 77 per cent sow thistle, with 22 per cent increasing. These few examples show the prevalence of some of the worst weeds. Many others are reported.

Insect Pests and Plant Diseases Practically every farmer reports the prevalence of the potato beetle but as most of them spray for it, it is kept in check. Potato blight and potato rot were very prevalent this year in all of the counties visited. The American tent caterpillar, which appeared in Dundas county some three or four years ago, has really revolutionized orcharding, so far as spraying is concerned. Many farmers are now spraying three times a year who three or four years ago never sprayed at all. This will result in cleaner and better fruit.

Gardens In the counties of Dundas, Waterloo and Northumberland vegetable and flower gardens are fairly common. The men, however, do not assist or encourage as much as they might and should toward keeping the garden in good condition. The women do nearly all the work. This phase of farm life, however, receives more attention in Waterloo than in the other counties visited.

Fuel About 52 per cent of the farmers visited use wood for fuel, while the balance use wood and coal or coal only. Thirty-four per cent of the farmers visited have a wood supply which will last indefinitely. Six out of the 400 farmers visited had done some forest planting; in most instances this amounted to only a small number of trees.

Labour Fifteen per cent employ male help by the year, 11 per cent by the month, 31 per cent by the day, the balance employing it in various ways. Sixty-four per cent employ Canadian born help, 13 per cent British born help, while 2 per cent employ foreign born help other than British. A large majority report the labour satisfactory, while four per cent report labour unsatisfactory. Fourteen per cent employ married men, while only 10 per cent have a house on the farm for the hired men. Unfortunately many who have houses are employing single men and only a few cases were found where the farmer was employing a married man and had a house for him to live in.

It is the general opinion among the farmers who have little or no trouble in securing satisfactory help that the solution of the farm help problem is largely in the farmer's own hands, being a matter of wages, treatment and hours.

Twenty-two per cent of the farmers report farm help as being scarce. Nearly all exchange work with their neighbours, but in

Dundas county this practice is being discontinued, the farmers preferring to hire help when it can be obtained.

Co-operation and Markets In each county visited there was a lamentable lack of co-operation in both selling and buying among the farmers. In Dundas the milk is made into cheese, which is sold through the cheese boards. The eggs are marketed, to some extent, through egg circles, but, for some reason, the egg circles are diminishing. Live stock is sold through drovers and fruit through commission men. Some co-operative buying is done through the Farmers' Clubs and the St. Lawrence Valley Fruit Growers' Association. Such supplies as seed, feed, salt, flour and spraying material are being purchased co-operatively to some extent. In Waterloo very little co-operation was found, as many of the farmers sell their products direct to the consumer on the Berlin market. One man stated that he and his family had not missed a Saturday's market in 22 years. In Northumberland practically no co-operation exists, although the opportunity is good for co-operative apple marketing. Other products are sold largely through the stores or exchanged for goods. In Carleton very little co-operation is reported, except in connection with the cheese factories.

Roads and Transportation In Dundas county the roads in the district visited were maintained altogether by statute labour. Sixty-one per cent suggested state control as a means of improvement, while 13 per cent are reported as being satisfied with the present condition. In Waterloo 72 per cent lived on roads maintained by statute labour, while 28 per cent lived on the county or township roads. Many of those living on the roads maintained by statute labour suggested the county system as a means of improvement, while many of those who lived on the roads kept up by the county state that the old statute labour system was best. It seemed to be a case of being best satisfied with what they did not have. It must be admitted, however, that some of the county roads are a disgrace. In Northumberland, the majority of the farmers lived on roads maintained by statute labour and seemed to be pretty well satisfied with them. In Carleton 96 per cent of the farmers lived on county or township roads, and the majority report being satisfied with the system.

Education Eighty-four per cent of the farmers visited had attended public school only and three out of the 400 had attended college. A number suggested the teaching of more agriculture in the rural schools as a means of improvement. Very few, however, express any opinion in regard



SOME PLEASURES OF RURAL LIFE

A well-kept garden on the farm will supply fresh fruits and vegetables for the table



LIVE STOCK ON ILLUSTRATION FARM, NORFOLK COUNTY, ONT.

Soil fertility can be maintained by growing plenty of clover and keeping live stock on the farm



to the schools, except to speak of the high cost. Farmers' Institutes seem to be almost dead in the four counties visited. In some places the Farmers' Clubs are taking their place. There is a growing recognition of the need for farm bookkeeping, but there seems to be, on the part of the farmer, a feeling of helplessness to solve the problem. Five per cent of the farmers report having attended a short course in agriculture, and it is a noteworthy feature that nearly every farmer who has himself attended a short course desires short courses for his young people.

Miscellaneous Ten per cent of the farmers have had boys leave and go to the city. Seven per cent have sons married who are farming. Nineteen per cent stated that they were following some form of bookkeeping, but only one man was following a complete method. Sixty-six per cent take agricultural papers. Seventeen per cent take story magazines. Seventy-seven per cent take a daily paper.

In 53 per cent of the families visited there were young people over 14 years of age, while in 31 per cent were to be found a horse and buggy or automobile for the young people. Sixty-one per cent of the farmers and their families attended some kind of community event or events during the past year, principally church socials and picnics. The rural churches have a great opportunity to develop the social side of their activities. They would thus reach more of the young people in the country and interest them in clean amusements, sports and recreation. The local fairs are also very generally attended by the farmer. In Dundas and Carleton counties no organized clubs for games were met with; in Waterloo 13 reported a football club, and in Northumberland, six reported baseball clubs. Only one farmer of the 400 visited mentioned attending a literary society. In no county was anything found in the way of neighbourhood playgrounds. Twenty-five per cent had no musical instrument of any kind in the house, while 39 per cent had pianos.

The figures given in this short statement constitute only a very small part of the information gathered by means of the survey.

AGRICULTURAL SURVEY, 1915

The following tables give the figures in detail of the survey for 1915 :

AGE, AREA AND SOIL

	Dundas	Waterloo	Northumberland	Carleton	Average
Average age.....	51	45	49	45	..
Percentage under 30 years of age.....	5	7	6	10	7
“ from 30 to 49 years (incl.).....	39	55	42	46	45.5
“ from 50 to 69 years (incl.).....	48	33	43	33	39.2
“ 70 years and over.....	8	3	6	7	6
“ of owners.....	88	90	78	91	86.7
“ of tenants.....	10	9	16	8	10.7
“ tenant and owner.....	1	1	6	..	2
Average size of tenant farm.....	187	129	131	133	..
“ size of owned farm.....	120	126	122	138	..
“ number of acres per farm in grain.....	29	54	34	39	..
“ number of acres per farm in hoe crop.....	9	13	12	7	..
“ number of acres per farm in cultivated hay and pasture.....	45	33	50	41	..
“ number of acres per farm in hay, pasture and crops.....	84	101	94	87	..
Percentage practising summer fallowing.....	5	8	5	5	5.7
Average area of summer fallow of those practising the same.....	8	7	7	6	..
Percentage having woods.....	85	84	78	67	78.5
Average acreage in woods of those having woods.....	24	12	17	47	..
Percentage having untillable land other than woods.....	69	72	59	30	57.5
Average acreage untillable of those having untillable land.....	25	15	18	53	..
Percentage having uncultivated tillable land.....	14	8	19	4	11.2
Average acreage of those having uncultivated tillable land.....	18	16	25	30	..
Percentage having clay soil on farm.....	54	29	36	47	41.5
“ having clay loam on farm.....	46	50	64	56	54
“ having gravelly soil on farm.....	22	8	7	..	9.2
“ having sandy loam on farm.....	21	39	33	22	28.7
“ having sandy soil on farm.....	17	16	16	12	15.2
(Many have several varieties of soil on same farm)					

ROTATION AND SEED

Percentage following systematic rotation.....	58	52	47	20	44.2
“ following rotation on part of farm.....	12	..	1	1	3.5
“ using seed grown on own farm.....	85	87	92	97	90.2
“ occasionally buying or exchanging seed.....	11	1	..	..	3
“ practising systematic selection of seed grain.....	1	2	1	..	1
“ obtaining seed from best part of fields.....	42	63	43	82	57.5

ROTATION AND SEED—*Continued*

	Dundas	Water- loo	North- umber- land	Carle- ton	Ave- rage
Percentage cleaning seed grain.....	98	95	99	97	97.2
“ cleaning seed grain once.....	29	45	59	24	39.2
“ cleaning seed grain twice.....	62	49	33	69	53.2
“ cleaning seed grain three times.....	8	2	7	5	5.5
“ treating for smut.....	1	15	1	7	6
“ growing wheat.....	20	92	39	46	49.2
“ knowing name of variety grown...	16	70	20	37	35.7
“ not knowing name of variety grown	4	22	19	9	13.5
“ growing oats.....	97	100	99	98	98.5
“ knowing name of variety grown....	41	77	56	80	63.5
“ not knowing name of variety grown.	56	23	43	18	35
“ growing barley.....	86	50	25	47	52
“ knowing name of variety grown....	11	40	9	14	18.5
“ not knowing name of variety grown.	75	10	16	33	33.5
“ not knowing name of any variety of grain sown.....	47	11	8	14	20
Average yield of wheat per acre in 1914 in bush- els, of those reporting yield.....	27	20	24	23	..
Percentage growing oats separately.....	26	94	93	94	76.7
Average yield of oats.....	42	40	32	38	..
Percentage growing barley separately.....	11	44	22	47	31
Average yield of barley.....	36	40	34	34	..
Percentage growing mixed grain.....	69	5	5	..	19.7
Average yield of mixed grain.....	38	37	33	..	..
Percentage growing two or more varieties of wheat.....	1	12	..	..	3.2
Number of varieties of wheat stated as being grown.....	6	16	6	9	9.2
Percentage growing two or more varieties of oats	..	13	6	6	6.2
Number of varieties stated as being grown	10	28	18	19	18.7
Percentage growing two or more varieties of barley.....	..	1	..	..	..2
Number of varieties stated as being grown.....	2	2	3	2	2.2
Percentage growing their own clover seed.....	6	3	13	..	5.5
“ growing their own timothy seed.....	37	5	13	22	19.2
“ of grain sown seeded to clover in 1915	50	38	35	29	38
“ sowing red clover in 1915.....	87	98	93	97	93.7
Average number of pounds of red clover sown per acre.....	6	7	7	4	..
Percentage sowing alsike in 1915.....	32	11	5	2	12.5
Average number of pounds of alsike sown per acre.....	2	1	2	1	..
Percentage sowing timothy in 1915.....	85	97	94	96	93
Average number of pounds of timothy sown per acre.....	8	4	6	8	..
Percentage growing alfalfa.....	8	26	24	22	20
Average number of acres per farm of those grow- ing alfalfa.....	2	6	5	3	..
Percentage reporting increase in crop yield over 10 years ago.....	23	43	39	41	36.5
Average per cent increase of those reporting in- crease.....	20	12	10	8	..
Percentage reporting better, without knowing increase.....	16	1	..	..	4.2
“ reporting same yield as 10 years ago	33	40	31	28	33
“ reporting poorer yield than 10 years ago.....	9	..	1	11	5.2

ROTATION AND SEED—*Continued*

	Dundas	Waterloo	Northumberland	Carleton	Average
Percentage not knowing whether crops are better or poorer.....	20	16	29	20	21.2
“ reporting increase over 20 years ago.....	12	23	12	15	15.5
Average increase of those reporting increase....	31	16	15	15	..
Percentage reporting better, without knowing increase.....	4	..	1	1	1.5
“ reporting same yield as 20 years ago.....	10	10	11	18	12.2
“ reporting poorer yield than 20 years ago.....	2	..	5	12	4.7
“ not knowing whether crops are better or poorer.....	71	67	71	54	65.7

MANURES AND FERTILIZERS

Percentage making use of farmyard manure.....	100	100	100	100	100
Average number of tons of manure applied per acre.....	12	8	11	13	..
Percentage using manure on grain only.....	..	4	..	2	1.5
“ using manure on grain and hoe crop.....	27	90	..	1	29.5
“ using manure on hoe crop only.....	..	..	63	56	29.7
“ using manure on meadow or young seeding and part on hoe crop or grain.....	30	6	34	6	19
“ using manure on meadow or young seeding.....	42	..	4	34	20
“ using chemical fertilizers.....	8	37	39	..	21
“ hauling manure out in winter.....	37	18	22	16	23.2
“ using all or part of manure as top dressing.....	66	19	35	41	40.2
“ using part of manure on orchard....	..	..	29	..	..
“ having manure shed.....	30	23	10	6	17.2
“ having manure cellar.....	4	..	..	..	1
“ saving all of liquid manure.....	3	3	..	..	1.5
“ exercising no care to prevent waste of manure.....	65	77	81	84	76.7
“ exercising some care to prevent waste of manure.....	32	23	19	16	22.5
“ exercising good care to prevent waste of manure.....	2	..	..	..	.5

GARDENS AND SMALL FRUITS

Percentage growing four or more varieties of small fruits.....	32	92	48	10	45.5
“ growing no small fruits.....	13	1	20	63	24.2
“ growing one to three varieties.....	54	7	32	27	30
“ having vegetable garden.....	97	10	94	72	90.7
“ of gardens well kept.....	37	74	59	47	54.2
“ of gardens fairly well kept.....	15	5	3	..	5.7
“ of gardens neglected.....	47	21	*	*	..

* Lateness of season prevented full report on gardens.

FUEL

	Dundas	Waterloo	Northumberland	Carlton	Average
Percentage using wood for fuel.....	64	30	41	75	52.5
“ using wood and coal.....	31	61	55	22	42.2
“ using coal.....	4	9	4	3	5
“ having supply of wood which will will last indefinitely.....	6	37	42	53	34.5
“ having supply of wood which will not last indefinitely, at present rate of consumption.....	78	51	42	26	49.2
Average number of years wood supply will last	32	22	17	14	..
Percentage having definite wood lot set aside...	56	77	65	47	61.2
Average size of definite wood lot in acres.....	17	12	14	30	..
Percentage having done any forest planting....	2	2	2	..	1.5
Average number of forest trees planted.....	150	66	280	..	..

LIVE STOCK

Average number of cows kept.....	13	10	7	9	..
“ number of other cattle kept.....	9	14	9	19	..
“ number of working horses kept.....	4	5	4	5	..
Percentage having colts on farm.....	68	53	48	75	61
Average number of colts on farms where colts are raised.....	2	2	3	3	..
Percentage keeping sheep on their farms.....	16	4	16	22	14.5
Average number of sheep on farms where sheep are kept.....	25	4	17	16	..
Percentage keeping brood sows.....	79	74	61	66	70
Average number of brood sows kept.....	1.7	3	1.3	1.5	..
Percentage reporting disease among stock in recent years.....	8	9	1	2	5
“ fattening swine annually.....	87	97	74	75	83.2
Average number fattened annually.....	19	29	14	9	..
“ number of hens kept annually.....	101	73	78	56	..

LABOUR AND CONVENIENCES

Percentage employing outside male help.....	80	87	83	68	79.5
Average number of days of male help employed.	180	273	172	337	..
Percentage employing female help.....	15	24	6	5	12.5
Average number of days of female help employed	146	268	319	448	..
Percentage employing male help by the year....	10	9	7	35	15.2
“ employing male help by the month..	13	10	6	15	11
“ employing male help by the day....	41	26	50	9	31.5
“ employing male help in various ways	16	42	19	9	21.5
“ employing Canadian born help.....	71	84	73	30	64.5
“ employing British born help.....	6	1	9	35	12.7
“ employing foreign born help other than British.....	3	2	..	3	2
“ reporting labour satisfactory.....	73	84	86	72	78.7

LABOUR AND CONVENIENCES—*Continued*

	Dundas	Water- loo	North- umber- land	Carle- ton	Average
Percentage reporting labour not satisfactory....	7	3	2	2	3.5
“ employing married men.....	17	18	14	8	14.2
“ having house for hired man.....	12	12	11	5	10
“ having workers in family over 14 years of age	55	50	44	34	45.7
Average number of workers over 14 in families having such.....	2.4	2.3	2.3	2.1	..
Percentage having male helpers in family over 14 years of age.....	48	43	35	29	38.7
Average number of male workers in families having such.....	1.6	1.3	1.7	1.6	..
Percentage having female workers in family over 14 years of age.....	40	38	26	22	31.5
Average number of female workers in families having such.....	1.4	1.5	1.7	1.2	..
Percentage paying members of family.....	2	20	15	12	12.2
“ having members of family as part- ners.....	6	..	..	..	1.5
“ reporting farm help scarce.....	29	21	22	15	21.7
“ reporting domestic help scarce.....	7	13	..	4	6
“ exchanging work with neighbours....	66	100	88	98	88
“ having gasoline engine on farm.....	22	53	11	4	22.5
“ having windmill on farm.....	15	28	3	16	15.5
“ having washing machine in house....	89	93	88	74	86
“ obtaining water from well.....	96	85	93	96	92.5
“ obtaining water from spring.....	..	15	7	4	6.5
“ obtaining water from stream.....	1	..	..	..	.2
“ obtaining water from nearby town system.....	2	..	..	..	.5
“ having well within 10 feet or in house over 10 feet and less than 50 feet	39	39	35	16	32.2
“ from house.....	39	26	38	38	35.2
“ 50 feet or over from house.....	18	34	27	45	31
“ having well 25 feet or less from stable or manure dump.....	8	15	5	3	7.7
“ having well over 25 feet and less than 50 feet from stable or manure dump.....	3	4	4	4	3.7
“ having well 50 feet and over from stable or manure dump.....	82	75	90	92	84.7
“ conveying water to house by hand..	91	50	94	89	81
“ having water piped to house.....	6	39	1	8	13.5
“ having water conveyed to house by pump.....	2	3	5	2	3
“ having water on tap (either rain or well water).....	18	40	1	7	16.5
“ having w.c. in house.....	7	13	3	2	6.2
“ having bathroom in house.....	16	10	5	1	8
“ having complete service.....	5	5	..	..	2.5
“ having house lighted with oil.....	95	97	97	100	97.5
“ having house lighted with electricity	3	3	3	..	2.2
“ having house lighted with gasoline..	1	..	..	..	.2
“ having house heated with stoves....	69	73	92	78	78
“ having house heated with furnace...	26	24	7	13	17.5
“ having house heated with furnace and stove.....	4	3	1	9	4.2

CO-OPERATION AND MARKETS

	Dundas	Water- loo	North- umber- land	Carle- ton	Aver- age
Percentage not selling any hay from farm.....	76	73	77	79	76.2
Average number of tons sold from farms where hay is sold.....	19	15	16	12	..
“ number of tons fed per farm on all farms.....	31	35	21	28	..
Percentage not selling any grain from farm.....	88	29	82	52	62.7
Average number of bushels of grain sold from farms selling grain.....	418	309	271	711	..
“ number of bushels of grain fed per farm on all farms.....	595	1700	716	816	..
Percentage selling potatoes.....	17	50	20	22	27.2
Average number of bushels sold.....	45	97	184	60	..
Percentage selling roots.....	1	57	..	..	14.5
Average number of bushels of roots sold.....	200	1000	..	..	..
Percentage feeding roots.....	14	87	78	63	60.5
Average number of bushels fed.....	119	1274	955	459	..
Percentage making use of straw as feed, bed- ding, etc.....	100	100	100	100	100
“ selling any straw.....	2	1	..	..	.7
Average number of miles from shipping point... 3.7	2.2	2.2	2.2	2.6	..
Percentage 2 miles or less from shipping point..	22	54	56	47	44.7
“ over 2 miles and less than 5 miles..	50	42	43	39	43.5
“ 5 miles or more.....	27	4	1	13	11.2
“ selling some farm produce co-opera- tively.....	28	1	28	49	26.5
“ selling only eggs co-operatively.....	23	..	..	..	5.7
“ selling only milk co-operatively.....	..	..	..	49	12.2
“ purchasing farm supplies co-opera- tively.....	56	11	5	3	18.7
“ selling fruit through commission men	26	..	2	1	7.2
“ selling fruit to consumer.....	..	42	..	..	10.5
“ selling fruit to buyers.....	..	..	82	..	20.5
“ selling live stock to drovers only ..	74	60	88	96	79.5
“ selling live stock to butchers only...	..	15	..	..	3.7
“ selling live stock, part to butchers and part to drovers	21	10	11	..	10.5
“ selling some farm produce direct to consumer, such as dairy and poul- try products, and truck stuff.....	43	74	19	21	39.2
“ selling some farm produce through middlemen.....	80	41	75	35	57.7
“ selling some farm produce through commission men.....	31	3	5	1	10

ROADS AND TRANSPORTATION

Percentage reporting roads maintained by sta- tute labour.....	100	72	74	3	62.2
“ reporting use of gravel or stone on roads.....	57	100	100	100	89.2
“ reporting use of earth on roads.....	29	..	..	..	7.2
“ reporting use of earth and gravel or stone on roads.....	13	..	..	..	3.2
“ reporting roads maintained by County or Township system.....	..	28	8	96	33

ROADS AND TRANSPORTATION—*Continued*

	Dundas	Waterloo	Northumberland	Carleton	Average
Percentage reporting roads maintained by Government system.....	..	..	8	..	2
“ suggesting state control of roads as a means of improvement.....	61	..	..	..	15.2
“ reporting as being satisfied with present condition of roads.....	13	65	82	87	61.7
“ reporting transportation service by rail.....	78	100	100	100	94.5
“ reporting transportation service by rail and water.....	22	..	..	..	5.5
“ reporting service satisfactory.....	11	1	45	24	20.2
“ reporting service not satisfactory....	2	2	..	..	1
“ considering rates high.....	6	2	14	7	7.2
“ having no direct dealings with transportation service and give no opinion regarding service or rates.....	75	98	39	70	70.5

EDUCATION

	Dundas	Waterloo	Northumberland	Carleton	Average
Percentage of farmers having attended public school only.....	77	96	73	93	84.7
“ of farmers having attended high school.....	18	3	21	5	11.7
“ of farmers having attended college..	1	1	1	..	.7
“ of farmers having attended business college.....	..	1	1	..	.5
“ of farmers not having attended any school.....	3	..	..	..	.7
“ of farmers' wives having attended public school only.....	70	95	67	74	76.5
“ of farmers' wives having attended high school.....	13	3	17	8	10.2
“ of farmers' wives who were school teachers.....	4	..	1	2	1.7
“ of farmers' wives who attended college.....	1	..	..	1	.5
“ of farmers' wives who attended no school.....	2	..	..	..	.5
“ reporting children having school garden.....	..	11	1	18	7.5
“ reporting children having home garden under teacher.....	18	12	11	15	14
“ not in touch with Farmers' Institute	29	34	49	47	39.7
“ reporting Institutes as dead or dying	26	23	11	3	15.7
“ favourable toward Institutes.....	15	34	36	56	35.2
“ unfavourable toward Institutes.....	13	4	9	6	8
“ stating Farmers' Clubs taking place of Institutes.....	2	..	..	..	.5
“ reporting visits of District Representative as helpful.....	50	4	3	34	22.7
“ reporting no visits from District Representative.....	38	96	97	54	71.2
“ reporting unfavourable attitude toward Representative.....	4	..	..	5	2.2

EDUCATION—*Continued*

	Dundas	Water- loo	North- umber- land	Carle- ton	Aver- age
Percentage who report as being indifferent toward work of Representative..	4	..	..	..	1
“ having attended a Short Course in Agriculture	5	6	4	4	4.7
“ reporting favourable attitude toward Short Courses.....	40	21	34	35	32.5
“ reporting unfavourable attitude toward Short Courses.....	12	14	24	5	13.7
“ reporting no desire for Short Courses for young people.....	42	91	75	81	72.2
“ reporting growing desire for Short Courses for young people.....	19	..	..	..	4.7
“ reporting a desire for Short Courses for young people.....	9	9	25	19	15.2
“ reporting the school as satisfactory ..	51	71	72	91	71.2
“ reporting school too expensive or salary too high.....	11	2	3	7	5.7
“ reporting that books are changed too often or too many subjects.....	4	3	2	..	2.2
“ suggesting that more agriculture be taught in schools.....	7	2	2	..	2.7
“ suggesting continuation classes.....	..	1	..	..	.2
“ suggesting consolidation of schools..	2	..	1	..	.7
“ suggesting school gardens.....	2	..	..	..	.5
“ having children at home under 14 years of age.....	55	67	40	46	52
Average number of children under 14 in families having such.....	2	2.9	2.7	2.7	..
Percentage having children between 6 and 14 years of age.....	46	58	36	32	43
Average number of children between 6 and 14 in families having such.....	1.6	2.3	2.1	2.1	..
Percentage having children attending school....	43	57	35	33	42
Average number of school children in families having such.....	1.6	2.4	2.1	2.2	..
Percentage having boys at home over 14 years of age.....	51	41	34	33	39.7
Average number of boys over 14 in families having such.....	1.1	1.3	1.6	1.6	..
Percentage having girls at home over 14 years of age.....	29	33	24	27	28.2
Average number of girls at home over 14 in families having such.....	1.6	1.5	1.6	1.2	..
Percentage of families from which boys have gone to city.....	16	15	6	4	10.2
Average number of boys per family gone to city	1.2	1.7	1.5	1.5	..
Percentage of families from which girls have gone to city.....	5	6	7	5	5.7
Average number of girls per family gone to city	1	1.3	1.1	1.8	..
Percentage of families having sons married who are farming.....	10	9	5	6	7.5
Average number of sons married who are farming in families having such.....	1.8	1.1	1.2	1.8	..
Percentage having sons married in other occupations.....	3	3	2	..	2
Average number of sons married in other occupations in families having such.....	1.6	1.3	1	..	..

EDUCATION—*Continued*

	Dundas	Waterloo	Northumberland	Carleton	Average
Average size of family including parents	4.3	5	3.9	3.8	..
Percentage of farmers visited born in the county	91	93	83	91	89.5
" of farmers visited, born in Ontario	96	94	89	93	93
" raised in town	7	3	10	5	6.2
" raised in the country	93	97	88	95	93.2
" following any form of book-keeping	18	27	18	14	19.2
" following complete method of book-keeping .....	..	..	1	..	.2
" receiving Government bulletins	78	74	60	58	67.5
" stating that they read the bulletins	63	57	49	50	57.2
" stating that they read part of bulletins .....	..	..	8	1	2.2
" taking agricultural papers	70	75	57	61	65.7
" taking two or more agricultural papers	31	30	22	15	24.5
" taking story magazines	30	18	14	7	17.2
" belonging to library	2	..	..	..	.5
" taking a daily paper	85	69	76	77	76.7

SOCIAL LIFE

Percentage keeping grounds around house in neat condition	37	63	44	45	47.2
" keeping grounds around house in fairly neat condition	17	2	1	..	5
" having telephone	45	87	45	56	58.2
" having R.F.D.	75	81	62	86	76
" having automobile	4	10	4	2	5
" of families having young people over 14 years of age	45	49	58	60	53
" having horse and buggy, or auto, for young people	27	37	34	28	31.5
" of farmers attending some kind of community event or events during past year	59	39	62	84	61
" attending fairs	39	27	54	76	49
" attending socials (principally church socials)	28	4	9	15	14
" attending picnics	16	19	20	27	20.5
" attending barn raisings	8	1	2	..	2.7
" attending concerts	3	1	3	3	2.5
" attending excursions	2	1	..	1	1
" attending ploughing matches .....	..	2	..	..	.5
" of farmers' families attending some community event in past year	34	36	30	28	32
" attending socials	27	6	9	11	13.2
" attending fairs	10	20	17	19	16.5
" attending picnics	5	23	22	14	16
" attending excursions	1	..	..	..	.2
" attending barn raisings	1	..	2	..	.7
" attending concerts .....	..	4	1	1	1.5
" of farmers attending fixed social events, as lodge	2	..	..	..	.5

SOCIAL LIFE—*Continued*

	Dundas	Waterloo	Northumberland	Carleton	Average
Percentage reporting organized clubs for games.	..	13	6	..	4·7
" attending literary society.....	..	1	..	..	·2
" reporting any neighbourhood playgrounds.....	..	..	..	..	..
" having no musical instrument in house.....	13	39	18	29	24·7
" having piano in house.....	51	17	51	36	38·7
" having organ in house.....	28	40	30	33	32·7
" having smaller instrument as gramophone or violin.....	8	4	12	3	6·7
" having in addition to piano or organ some smaller instrument.....	7	4	10	4	6·2

MISCELLANEOUS

Percentage not housing all implements when not in use.....	54	84	90	18	61·5
" having implement shed.....	86	94	73	82	83·7
" having barn lightning rodded.....	7	81	4	10	25·5
" having house lightning rodded.....	2	31	3	8	11
" stating that they paint their implements at regular intervals.....	11	..	3	1	3·7
" not having house painted.....	12	5	13	23	13·2
" not having barn painted.....	80	91	75	97	85·7
" reporting lack of suitable labour as a drawback.....	10	5	..	..	3·7
" reporting lack of capital as a drawback.....	4	..	..	1	1·2
" reporting lack of co-operation as a drawback.....	3	..	1	..	1
" reporting lack of drainage as a drawback.....	2	..	..	..	·5
" mentioning dairying as one of their special branches of farming.....	97	23	20	24	41
" mentioning live stock as one of their special branches of farming.....	7	11	7	15	10
" mentioning fruit as one of their special branches of farming.....	5	..	21	1	6·7
" following general mixed farming...	4	73	62	62	50·2
" blaming neighbours or previous owners for prevalence of weeds...	7	..	4	..	2·7
" reporting "don't know" cause of prevalence of weeds.....	21	..	..	..	5·2
" reporting common causes as wind, neglect, grass seed, etc.....	72	30	27	12	35·2

AGRICULTURAL SURVEY, 1915
WEEDS

	Dundas					Waterloo					Northumberland					Carleton					
	r	a	b	c	n	i	d	r	a	b	c	n	i	d	r	a	b	c	n	i	d
Bindweed.....	5	3	2		2		2	3	2	1			1	1	9						
Bladder Campion.....	1							4		2			1		3						
Blue Burr.....								2	2					2	15	8	6	1	4	9	2
Blue Weed.....	2	2			1										1				1		
Canada Thistle.....	57	50	6			3	54	97	65	31			5	66	85	74	9	1		4	34
Chickweed.....	1	1					1	1	1	1			1	1	2	1	1			1	
Chickory.....	1	1			1			2	1	1			1		4	3	1			3	
Couch Grass.....	83	47	33	2		5	74	55	39	16		1	11	33	82	59	22	1		16	52
King Devil.....	1		1			1															
Lamb's Quarters.....	1	1					1	1	1	1					1		1				
Mayweed.....	6	3	3			1	3														
Milkweed.....	4	2	1			3		1	1				1		1		1				
Mustard.....	98	14	62	21		35	44	25	24	1				15	61	23	37	1		35	6
Night Fl. Catchfly.....								1	1				1		1		1				
Orange Hawkweed.....	2	1	1		2																
Oxeye Daisy.....	24	18	5	1	4	1	16	13	13				2	3	29	28	1			3	1
Pigweed.....	18	11	7	1		4	10	2		2			1	4	1					2	1
Ragweed.....	19	9	9	1		2	10	4	82	53	29		34	21	93	26	59	8		2	74
Sow Thistle.....	88	60	22	6	56	26	6	78	54	24		4	24	35	62	50	12			8	21
Stinkweed.....																					
Wild Carrot.....	1							1	1						4					1	1
Wild Flax.....								2	1	1				2							
Wild Oats.....								39	26	13			10	16						8	
										</											

KEY TO HEADINGS:

Column (r) gives total percentage of farmers reporting the weed.
 Column (a) gives percentage reporting it as scarce on farm.
 Column (b) gives percentage reporting it as numerous on farm.
 Column (c) gives percentage reporting it as very bad on farm.

Column (n) gives percentage reporting it as new to farm in last five years.
 Column (i) gives percentage reporting it as increasing.
 Column (d) gives percentage reporting it as decreasing.

AGRICULTURAL SURVEY, 1915
INSECTS AND PLANT DISEASES

	Dundas					Waterloo					Northumberland					Carleton												
	r	a	b	c	n	i	d	r	a	b	c	n	i	d	r	a	b	c	n	i	d							
Codling Moth.....	55	27	16	2	...	7	33	68	7	59	2	...	63	2	47	38	9	...	1	8	22	2	1	1	...	...	...	2
Cut Worm.....	14	7	7	...	3	7	...	13	10	3	...	3	2	...	2	10	4	...	5	...	...	17	4	13	...	1	14	...
Potato Beetle.....	97	4	9	84	...	77	12	97	...	41	54	...	72	5	93	2	75	16	...	36	5	98	1	93	3	...	46	4
Pea Weevil.....	2	1	...	1	1	1	...	3	2	1	...	1	1	...	1	...	1	...	1	...	2	1	1	...	1	...	1	...
Turnip Aphis.....	2	1	...	1	1	1	...	3	2	1	...	1	2	3	...	2	2	1	...	1	...	2	1	...	1	...	1	...
White Grub.....	2	1	...	1	1	1	...	28	12	6	...	9	3	...	15	4	11	...	1	10	...	2	1	...	1	...	1	...
Wire Worm.....	3	2	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Apple Scab.....	35	28	7	...	...	4	24	10	6	4	...	7	...	52	30	22	...	1	37	...	...	...	...	...	...	...	...	...
Oat Smut.....	35	27	8	...	12	14	4	47	29	57	...	3	75	1	65	22	44	...	9	49	2	71	21	50	...	2	67	1
Potato Blight.....	11	8	3	...	...	2	1	85	8	75	4	1	83	...	88	6	77	3	1	85	2	37	13	24	...	...	37	...
Potato Rot.....	5	4	1	...	1	1	1	87	15	70	2	...	82	...	82	15	63	4	3	76	...	77	42	35	...	...	73	...
Potato Scab.....	6	4	2	...	1	1	1	6	6	...	...	...	1	...	13	5	6	1	...	10	...	13	10	3	...	...	11	...
Rust.....	37	22	4	1	3	7	7	24	24	...	...	...	1	3	11	10	1	...	1	6	1	21	20	1	...	...	12	3
Wheat Smut.....	...	...	...	...	...	...	...	56	39	17	...	2	33	4	4	4	4	...	...	1	...	13	10	3	...	1	10	1

KEY TO HEADINGS:

Column (r) gives total percentage of farmers reporting the pest.
 Column (a) gives percentage reporting it as scarce on farm.
 Column (b) gives percentage reporting it as numerous on farm.
 Column (c) gives percentage reporting it as very bad on farm.

Column (n) gives percentage reporting it as new to farm in last five years.
 Column (i) gives percentage reporting it as increasing.
 Column (d) gives percentage reporting it as decreasing.

MR. SNOWBALL—Did you ask those farmers who reported having weeds on their land whether they were taking any action to get rid of them?

MR. NUNNICK—That question was not asked, but there is really not very much being done in the Province of Ontario in the way of government action, other than the appointment of occasional inspectors, and they are too often, as was suggested this morning, not in a position to rigidly apply the law as it is at the present time. I might state that a number of the farmers visited reported that the weeds were decreasing, owing to methods of better cultivation, but I did not get the figures of the farmers so reporting.

MR. SNOWBALL—Have any remedial measures been adopted, because it would appear that the farmers in Ontario are more neglectful than they ought to be. May I ask whether you intend to make similar surveys in the other provinces, for example, in New Brunswick?

MR. NUNNICK—There have been already two surveys made in New Brunswick, in fact, in all the provinces of the Dominion. This particular survey was made for the Lands Committee, as a guide in selecting an illustration county in connection with the plan of Illustration Farms. Surveys similar to this have been made in seven or eight different districts in the Province of New Brunswick.

MR. ARSENAULT—I am surprised to hear that weeds are on the increase in some of the other provinces, or at least, not on the decrease. I do not think that is the case in Prince Edward Island. There the Pure Seed Act is being enforced to, perhaps, a greater extent than in any other province. I know that all seed sold by the merchants in Prince Edward Island is carefully inspected, and several have been fined for selling impure seed, although through no fault of their own, because they purchased the seed from the wholesalers in good faith. Nevertheless, although innocent themselves of any intention to infringe the law, they could not escape from the penalty which that law provides. We have also found that our seed farms have been a great inducement to farmers to procure good seed and sow it. In the matter of pure seed there has been a wonderful improvement, so much so that it has resulted in the creation of a demand for some varieties of our seed, especially oats. I am very glad to report that so far as Prince Edward Island is concerned, we are making very material progress in weed eradication.

I was very much interested in Dr. Robertson's report on the Illustration Farm work, but there is one thing which must be said: As far as Prince Edward Island is concerned I am afraid what is suggested is going to be of very little practical use, for the reason that

those farmers who have the good land, and experience no difficulty in getting along, may be further benefited; but what we chiefly need is to show the poor farmer, and the man who has the poor land, how he can best treat that land to make it more productive and advance his own interests. If something could be done in the case of the poorer land, I am sure it would accomplish much more good.

In Prince Edward Island we are installing tile drainage, as Prince county is practically all low-lying land, especially west of Summerside. I understand that in Ontario a great deal has been done towards the improvement of these low-lands by under drainage. This low land is really the best land we have, but for three years in succession there has been a failure of crops, owing to the wet seasons.

To repeat, I would like very much to see something in the line of experimental stations, applied to poor land, to see what the result would be.

MR. MCKAY—Is it possible to determine what is the relative proportion between the growth of weeds and the choice of seed? I notice in your statement, Mr. Nunnick, that the porportion of farmers using selected, or proved seed, is very small. The number of farmers using from year to year their own seed is very large, and does that not bear an important relation to the growth of weeds? I have not thought out the point myself, but the idea just occurred to me, and no doubt it has received attention from others, if pressure could not be brought to bear on users of seed along the desired direction. We employ pressure in order to prevent the spread of diseases of all kinds, and, to my mind, weeds constitute a serious menace. I would like to ask for information on that point.

MR. NUNNICK—The Federal Department of Agriculture has made some investigations along that line. It has taken samples of seed from a great many places for analysis to see what they contained in the way of impurities. Very few of the farmers clean their seed through the fanning mill as many as three times, but quite a number clean it through perhaps once or twice. A great many do not clean their seed at all. It is not at all necessary to buy new seed; in fact, from the discussion we heard this morning, it is more advisable for a farmer to use the seed produced on his own farm and properly clean the weed seeds out. In New Brunswick, I was once walking along the road close to a field where a man was sowing. I dipped my hand first in a stream close by and then in the bag of seed. When I took my hand out it was covered with weed seeds, showing that the man had not cleaned his seed at all. One of the best means for preventing the spread of weeds is to thoroughly clean the seed that is used.

MR. SNOWBALL—Can the farmer tell by examining his seed what weed seeds are in it? Would not such an examination require an expert?

MR. NUNNICK—The officers of the Seed Branch of the Department of Agriculture offer their services freely to any farmer who wishes to send in samples for analysis; but any farmer who cleans his seed two or three times through the fanning mill will have very pure seed to sow. Many farmers of course do not know what weeds their seeds contain—in fact they know very little about it.

DR. JONES—Is there any restriction upon the importation of seeds? We were told this morning that many of these weeds had come from the use of seed imported from Europe, and even from Turkestan. There are very rigid restrictions against the importation of animals from foreign countries on account of the diseases prevalent there to which animals are subject. Are there no restrictions against the importation of seeds which are used in planting? If not, why should not that subject be taken up?

HON. MR. BROWN—It is a most difficult thing to get clean seed into the country and keep the land clean; it is almost impossible to do it. I have been connected with three distributions of seed grain among the farmers of Saskatchewan, although I had nothing to do with the last distribution, and I have no hesitaion in saying that the Dominion Government, with all the experts in its employ and all the appliances at its disposal—I am not blaming any particular Government, I mean the Federal Government in the last 25 years—has put more dirty seed into the country than has any other source. The first year seed was distributed in Saskatchewan the farmers did not know what mustard was. The young man who was shipping the seed came to me and said: "There is something in this seed, and I do not know what it is." I said: "It is mustard. You have got mustard here. The men had better take the seed away and clean it." In last spring's distribution of seed I think 8 per cent of wild oats was allowed. You might as well have 20 or 30 per cent. Out of the seed distributed last year I don't think anybody got seed that was clean, that is, as far as oats are concerned; 90 per cent of the seed oats distributed last year had wild oats in them. That was in a district of the province that was formerly entirely clean, and the province itself had a reputation of being the cleanest province as regards weeds.

With respect to wheat, I saw several fields, and in one that yielded 51 bushels to the acre I counted six or seven varieties of wheat, Marquis, Red Fife, and other varieties; yet the Dominion Government has experts and three large elevators that cost a couple

of million dollars each, equipped with the most up-to-date machinery for cleaning purposes, at its disposal. I do not say the government is to blame; I simply mention the fact, to show you how difficult it is in the West, and especially in our part of the country, to buy clean seed. Once foul seeds are introduced a man cannot get them off his farm, no matter what method of farming he practises, although he might keep down the number. The farmer should not be blamed any more than anybody else, for the bringing in of weed seeds, because he has been just as faithful and just as diligent in searching for and sowing seed as clean as could be got from the experts and the elevators equipped with the best machinery for cleaning.

THE CHAIRMAN (Dr. Robertson)—Last year there were at least one hundred times more acres in Canada sown with clean seed, absolutely clean seed, than ten years ago, through the work of the Canadian Seed Growers' Association. It is exceedingly difficult to get clean seed, especially grass and clover seed, but now, I think, we are in a fair way to getting the country sowed with clean seed, through the work of that association, and farmers growing their own seed from selected plots. But no matter how clean the seed may be, that does not insure clean fields. The weed is a persistent and prevailing enemy. It gets in by all channels and avenues, it has to be fought year in and year out. Even in the old civilizations, after centuries of persistent fighting, they have still some weeds; but they keep them down by rotation of crops, after-harvest cultivation and by growing legumes. We will have to adopt the same means. I do not see myself that the menace is so much from the sowing of weed seeds as from filthy methods of cultivation. I want to comfort you again by repeating that there were over a hundred times more acres sown last spring with real clean seed than ten years ago, and that condition is multiplying very fast. The persistent fight against weeds must continue, because we are getting a reputation, and deservedly so—one does not blame the farmer—of being the weediest agricultural country in the world, because of our climatic conditions, the scarcity of hand labour, and other influences.

MR. MCKAY—In view of your very large experience, Dr. Robertson, I would like to ask, do you not think the time has arrived—in view of the fact that so much has been accomplished, by the farmers themselves getting together and selecting their seed, paying so much attention, and giving up their time and means to the elimination of the weed—when some pressure should be brought to bear upon the farmer who is not particular himself about the character of the seed he uses, to compel him to use good seed?

THE CHAIRMAN (Dr. Robertson)—The Committee on Lands is bringing in a resolution on that very question, Meanwhile, there is quite stringent legislation against the sale of seed with weeds in it, and that law is being enforced all over Canada.

I can recall when all the cleanings, including the weeds, from clover seeds, in Toronto, were sent down to Prince Edward Island and sold as whale, salmon and herring seeds, three-fourths being made up of weeds of the worst kind. When the agitation to pass a stringent law in that respect began, a deputation of these seed-growers and seedsmen came to Ottawa and made a strong case against the proposition. To prepare for this I had collected, and caused to be collected, samples of these seeds, and had the number of wheat seeds per pound tabulated. I had this information in my pocket, so I said to the spokesman of the deputation: "If you carry this further I will present you with data and with the name of the man in Toronto who sold this seed, and I will advise the people of Prince Edward Island to visit Toronto and lynch him, as being the party responsible for the introduction of such seeds into their province." That, of course, was rather an extreme case. There is now a very strong demand in all the provinces that the inspectors should enforce the law. Anyone can be prosecuted under the Act, but no man wants to prosecute his neighbour, and therefore you must, I think, appeal to the farmer on the ground that it pays to have a clean field, and that he will be punished if he has a dirty one. For long years the prohibitive legislation has been on the statute book, but it has not killed a weed; it takes a man, and intelligence, to do that.

HON. MR. BROWN—In the western provinces we have regular inspectors to enforce the law. A difficulty arises in dealing with a man who has a very weedy crop, in that it may be all he has to pay his debts and to live on. In that case you cannot very well order him to cut the crop down. Here is another difficulty: If the offender lives within ten miles or so of the inspector, the latter hesitates to prosecute him when he is doing his best to clean the land. To enforce the law you would require inspectors who did not reside in their inspection districts, men who were not known at all and were unlikely to be sympathetically influenced by local conditions. I think there is only one way to clean out the weeds, namely, get a good class of farmers, and if successful they will have the means to buy the necessary machinery, because there is no doubt the eradication of weeds costs a lot of money.

MR. SNOWBALL—In New Brunswick the farmers have been educated through seed exhibits and farmers' gatherings to purchase

the better grades of seed. I happen to be quite a distributor of seed, and I find that in the last few years the farmers are ordering the best qualities. As a precautionary measure, during the last two or three years, I have asked the person from whom I purchased the seed to deliver it to me early enough to permit of sending samples to the Department at Ottawa. I think that has been a deterrent, and has made seedsmen careful, so that the reports I received from Ottawa on the different samples have been in every case satisfactory. I think that is one way of overcoming the difficulty complained of—to send samples of the seed here for analysis before offering it for sale.

HON. O. T. DANIELS—This is a most interesting subject to any person who is associated with the agricultural industry of this country, and I have been very much struck with the value of this paper. In my youthful days, I had practical experience with some of the weeds and I know them exceedingly well. Some of the weeds referred to in the paper just read are at present, I am bound to say, even in the agricultural districts, not regarded as such a nuisance as they were some years ago. For instance, wild mustard—a weed that we used to call charlock—is found to be an exceedingly good article of diet for cattle, as also a splendid agency for the restoration of humus to the soil, and the sharp practical farmer has a different opinion of the charlock or wild mustard than he did twenty-five years ago. The couch grass is a serious thing if you are hoeing, but it naturally indicates a high state of tilth in the soil. It is therefore regarded, among orchardists, particularly, as a very nice plant to restore humus to the soil and develop a good crop of apples in the orchards. But we are troubled in Nova Scotia with the ragwort, a weed that we seem to be unable to do anything with at all. It has broken out in certain sections of Pictou and Antigonish counties. Personally I never saw the weed, but many complaints are made of its spreading. As I understand it, it does not confine itself to ploughed fields, but, if it gets into pastures, the seed is carried by the winds, with the result that it may devastate any area in which it may happen to lodge. If this Commission could advise our farmers in the counties referred to with respect to the elimination of this weed—either confining it to the area in which it has already appeared, or the destruction of it by any means other than the tearing of it out by the roots—I am sure it would be a great boon to the farmers in those particular counties of Nova Scotia.

Water and Water-power Problems

BY

ARTHUR V. WHITE

Consulting Engineer, Commission of Conservation

IN my annual statement, a year ago, it was intimated that it would probably be some months before certain matters then under consideration could finally be dealt with. It was not, however, anticipated that a whole year would pass without affording the opportunity to dispose of some of the items.

In connection with the water interests of Canada, questions demanding prompt attention may arise at any time, and even while under consideration questions sometimes assume different aspects, thus requiring further investigation. Enquiries from government departments in other countries as well as in Canada involve at times very considerable research.

Last year's Annual Report contains a comprehensive statement respecting certain very important water problems with which the Commission of Conservation is especially concerned; as, for example, the proposed development of power on the St. Lawrence river at the Long Sault rapids; the unauthorized diversion of water from the Great Lakes system by means of the Chicago Sanitary District canal, and the hydro-electric power developments at Niagara Falls.* A brief reference is here made to the present state of these problems.

LONG SAULT RAPIDS, ST. LAWRENCE RIVER

With respect to the Long Sault rapids on the St. Lawrence river: The charter of the Long Sault Development Co. has been declared to be unconstitutional. To secure a re-establishment of its status with respect to its former charter, the company has filed an application with the Supreme Court of the United States, with the object of having its case re-opened before that tribunal. The case will not come up for hearing until April, 1916, but the Commission of Conservation is keeping informed upon this matter.

* See *Sixth Annual Report*, Commission of Conservation, Ottawa, 1915, pages 136-151.

WATER DIVERSION BY CHICAGO

The Sanitary District of Chicago has been diverting, from the Great Lakes system into the Mississippi river, more than double the quantity of water—4,167 cub. ft. per sec.—authorized by the United States Secretary of War. An action by the Attorney General of the United States against the Sanitary District is being tried in the District Court of Chicago.

**Friendly
Suit to Secure
Testimony** This action has been referred to, by some persons in the United States, as a "friendly suit." The signification of the phrase, as thus used, being that, inasmuch as it was anticipated such suit would involve the taking of a great deal of technical testimony, it was considered desirable to have the testimony submitted in one of the lower courts and then, subsequently, the case could be submitted in printed form for the consideration of the Supreme Court.

The quantity of water which is being diverted by the Sanitary District is avowedly a transgression of its permit from the U. S. War Department. Many Canadians have been unable to understand why it has been necessary to develop such a prolonged and extensive technical case, when the fundamental fact at issue, *viz.*, the diversion of the water in direct violation of the government permit authorizing same, is so outstanding a fact that it can scarcely be made more cogent by technical or other special evidence.

**Construction
of New Canal** With regard to the additional carrying capacity of the newer canal, known as the Sag or Calumet cut-off, the United States Secretary of War authorized the construction of this new canal, subject to the provision that, as a result of such construction, the total diversion of water, through both the Chicago and Calumet rivers together, should not be greater than the amount specified in the permit, namely, 4,167 c.f.s. As the Chicago Drainage canal has been designed to carry about three times the quantity of water authorized by the permit, there is no apparent justification for the construction of a large *additional* channel like the new Calumet cut-off. Once such channels are actually constructed, the requests for additional water may be expected to become more and more insistent, or the water may, as at present, be taken in defiance of authority. Obviously there will always be greater danger of having water diverted, with consequent injury to the interests entitled to use it in its natural channels, than would be the case if such channels were not created; consequently, the construction of such channels as the Calumet cut-off is a serious additional menace.

DIVERSIONS FROM ST. CROIX RIVER, NEW BRUNSWICK

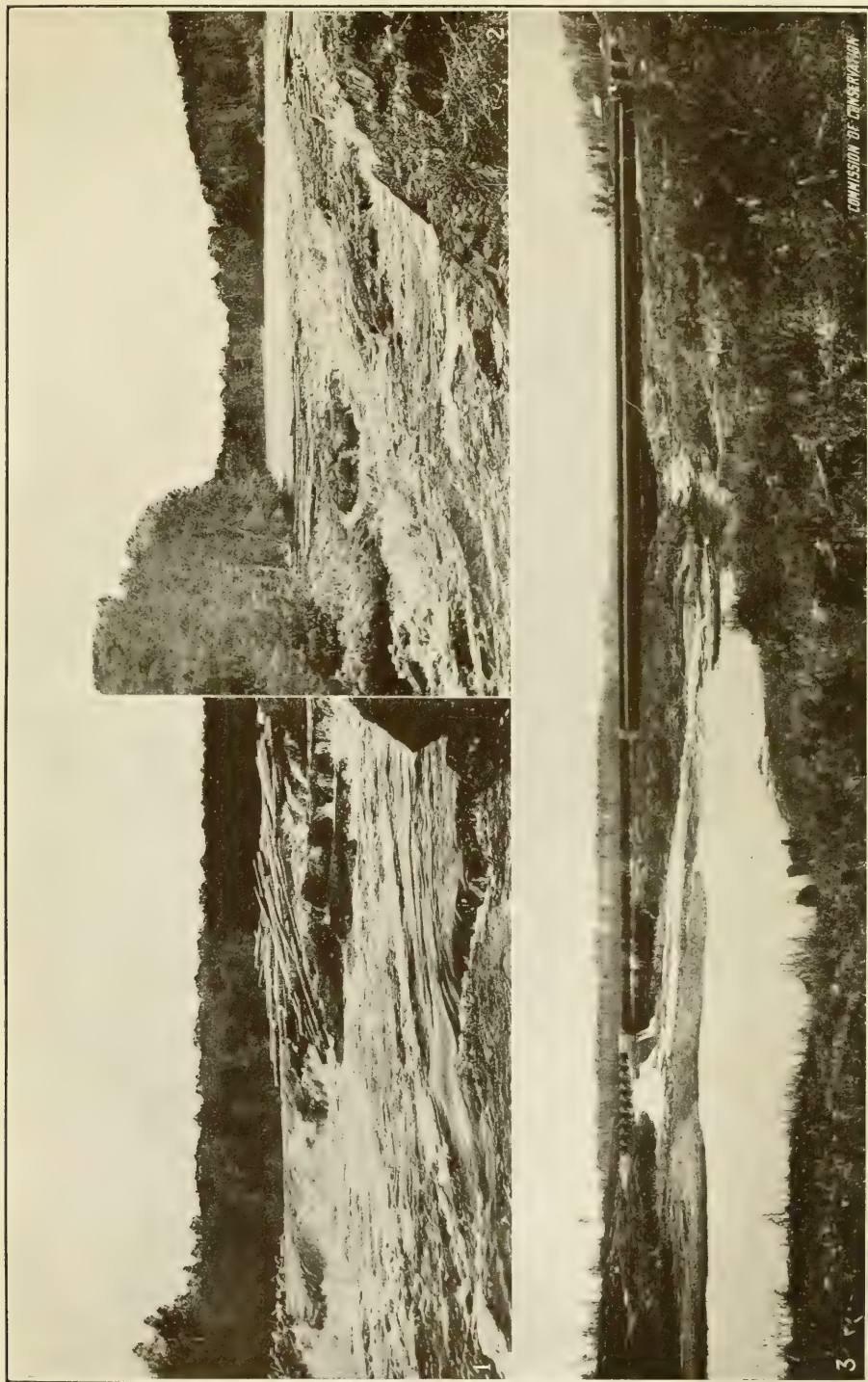
In 1915, the Commission of Conservation had brought to its attention an unauthorized diversion of boundary waters on the St. Croix river, which forms part of the international boundary between New Brunswick and Maine.

Water-power Available Briefly stated, the facts are as follows: United States financial interests, controlling the St. Croix Paper Co. of the state of Maine, and operating through two allied companies—St. Croix Water Power Co., chartered in 1899 by the Legislature of Maine, and the Sprague's Falls Manufacturing Co., Ltd., chartered in 1902 by the Parliament of Canada—secured control of the two most valuable power sites on the St. Croix river—one at Sprague falls, the other at Grand falls. The electric energy capable of development aggregates some 25,000 horse-power, and is to be used entirely on the United States side for the operation of pulp and paper mills located at Woodland, Me., where a thriving community, with a population of 1,500 to 2,000, has, as a result of this power development, already been built up.

At Sprague falls, the capacity of the power plant is about 12,000 to 14,000 horse-power. Another plant, situated near Grand falls, about ten miles above Woodland, has recently been completed, with an additional rating of 12,000 to 14,000 horse-power, which is transmitted to Woodland to increase the capacity of the Sprague Falls plant. The property of the St. Croix Paper Co., exclusive of its extensive timber holdings, represents an investment of over \$3,500,000, and the average net earnings are stated to be over \$300,000 per annum.

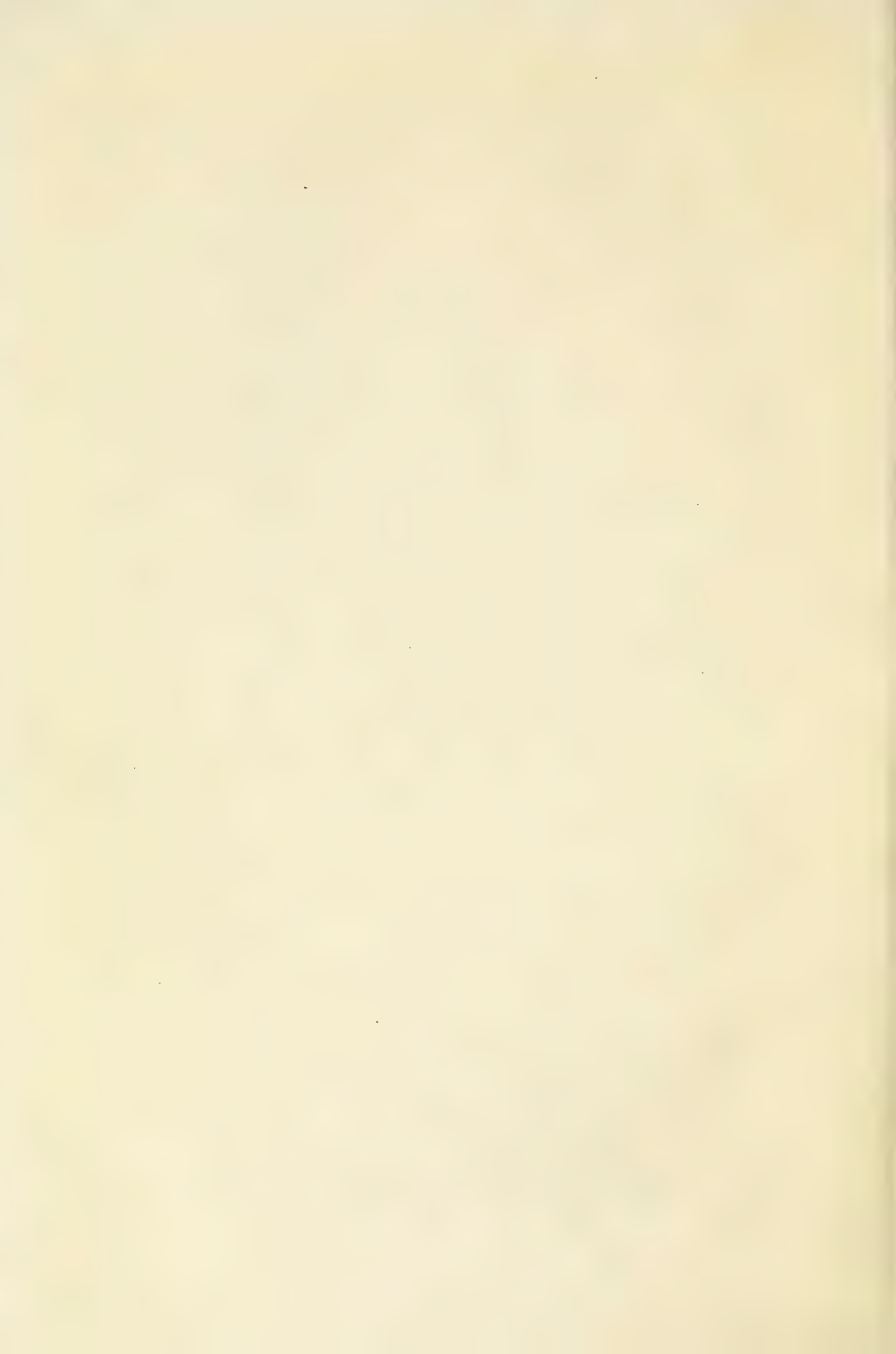
To develop this power at Grand falls, the Company constructed a large canal, lying and extending for nearly a mile, entirely within the state of Maine. By means of a dam erected across the international boundary at Grand falls, an artificial lake has been created so as to enable the water of the St. Croix river to be diverted, by the canal, into the United States for the development of power at the Grand Falls power house. At its lower stages, the total flow of the St. Croix river—an international boundary stream—is diverted into the United States.

Commission of Conservation takes Action The Commission of Conservation being requested to report upon this diversion, the Assistant to Chairman, Mr. James White, appeared before the International Joint Commission and presented, on behalf of the Commission of Conservation, a memorandum objecting to the diversion; also requesting that the use of Canada's share of the waters of



GRAND FALLS, ST. CROIX RIVER, FROM CANADIAN SIDE

- (1) "Upper Pitch", and (2) "Lower Pitch", about two years before construction of dam.
(3) General view of dam, as it appeared on May 22, 1915



the St. Croix river be only permitted on such terms, including time limit, as would ensure that the province of New Brunswick, or the Dominion of Canada, would receive reasonable compensation for the use of Canada's waters; and, further, that Canada's equity in the waters, *per se*, be inalienably preserved.

On November 9, 1915, the International Joint Commission granted the application, provided*:

(a) That the applicant companies obtain from Canada and the United States, authority for the maintenance of the dam and the obstruction, diversion and use of the waters of the St. Croix.

(b) If the waters so diverted cease to be used for generating power for the St. Croix Co.'s pulp and paper mill, the order of approval shall thereupon cease to be operative unless the International Joint Commission continue it.

Other clauses forbid undue lowering or raising of the level of the water.

The time will come when Canada will require her share of all such water-powers. One element of danger which the Commission emphasized in connection with the diversion of waters like those of the St. Croix river into the United States, was that, while the International Boundary Waters Treaty contemplates the possibility of certain "temporary" diversions, yet, unless the terms and conditions of such temporary diversions are explicitly understood and specified, and means taken to render the diversion only a "temporary" one with respect to time, interested parties may, later, claim that the diversion has resulted in the establishment of vested interests, and should "now" be regarded as of a more or less permanent, rather than of a temporary character.

NIAGARA POWER DEVELOPMENT

In 1915, it was pointed out that a complex situation in connection with power development, exists along the Niagara river,—more particularly in the vicinity of Niagara Falls. Attention was drawn to two bills, the Cline Bill and the Smith Bill, presented to the United States Congress, both of which measures contain features which, if enacted into law, would be detrimental to the interests of Canada.

Attention was also drawn to the *Opinion* delivered by the Public Service Commission of the state of New York, and the Commission was quoted as representing that:

* See Appendix (I.) for text of approval by the International Joint Commission *re* the St. Croix Water Power Co. and the Sprague's Falls Manufacturing Co.

"There is a large shortage of electric power in western New York, with a strong demand for greater supply which is not being met by existing companies * * * We are using all the power made on the New York side, and all that has been brought from Canada, and the demand for more power in western New York is insistent and being urged with great force."

The Public Service Commission also urged that if the importation, into the United States, of power from Canada were prohibited it "would plainly amount to a great public calamity."

All these facts indicate that the time has arrived when the strongest possible efforts will be made by United States interests to secure, for power purposes, more and more use of the waters of the Niagara river.

**United States
Interests
Active**

In the United States there are a number of public organizations already actively interested in securing additional development of Niagara power. A Water Power Investigating Committee, appointed by the New York Legislature, under the chairmanship of Senator George F. Thompson, has recently been holding hearings in New York city and elsewhere. At these hearings, the president of the American Civic Association is reported to have stated that "the Thompson Committee was looking for testimony which could be distorted into an excuse for a development of vast importance to the city of Niagara Falls, at the expense of the state and nation."

The Hydro-Electric Association of Niagara Falls has been holding meetings and drafting proposed legislation which it is stated will be presented to the New York Legislature early in 1916. This organization seeks the use of the 4,400 c.f.s. available in the United States under the International Boundary Waters Treaty, but which has not yet been apportioned.

New York financial interests have had engineers exploiting, and making representations to government departments in the United States, respecting projects for the proposed development of power by means of dams in the lower Niagara river.

The Federal Light and Power Co. of Detroit, it has been stated, has secured a permit from the United States Government permitting the laying of cables under the Detroit river with the object of importing Niagara power to Detroit *via* Canada.

Hearings respecting Niagara power have been held at Washington before the Committee on Foreign Relations. The Smith, Cline and similar bills have been under discussion by this important committee.

More
Niagara Power
Desired

When development commenced at Niagara Falls, there was comparatively little market for electric power on the United States side of the river. Consequently, electro-chemical industries were induced to start, and large blocks of power were contracted for at a comparatively low figure. Considerable quantities of power were also exported from Canada to the United States, some of it being used in the newly started industries. The United States interests now fear that if they do not get the balance of the power that is already available, and can be made available under the existing treaty, at Niagara Falls, that the power will be used in Canada to build up Canadian industries. Before long, the electro-chemical industries, such as those manufacturing nitrogenous products, will be re-establishing themselves elsewhere. Under existing contracts they are getting at \$10, \$12 and \$15 per horse-power, power that has a market value in cities in New York state, ranging from \$60 to \$75 and upwards per horse-power. Now, if these industries in the United States can continue to increase their importation of electricity from Canada for a little while longer, and if the available surplus from Canada can once be transferred to the United States, then, according to the New York Public Service Commission, there need be no fear of its being withdrawn. This is a matter of great importance to Canada. Southwestern Ontario is the most populous portion of the Dominion. It is demonstrable that, if the energy now being exported to the United States, and the additional energy that may be exported under future permits, can not,—as is claimed by the Public Service Commission of the State of New York,—be retained for use in Canada, it will be a most serious national loss. Too much emphasis cannot be placed upon the value to Canada of her share in the immense water-power of the Niagara river.

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

The growing market for Niagara power in Canada is strikingly emphasized by the success of the undertakings of the Hydro-Electric Power Commission of Ontario. Recently, the Chairman, Sir Adam Beck, in drawing attention to the fact that its transmission lines are now carrying from Niagara a load of 110,000 horse-power, said that he could not help recalling the time when the late Premier, Sir James Whitney, told him that "the Commission will not require 10,000 horse-power." As a matter of fact, the markets for the power have developed so rapidly that the Commission has been compelled, earlier than was anticipated, to seek diligently for new sources of power.

Sir Adam has stated that, out of the unappropriated portion of the 36,000 c.f.s. allotted to Canada under the Boundary Waters Treaty, 6,000 to 6,500 c.f.s. is still unappropriated. He proposes that this surplus be utilized under a head of 300 to 305 feet, resulting in the development of about 200,000 horse power. The water could be conveyed from the vicinity of Welland river* to a power house near Queenston.

Gradual Reduction in Rates All the Niagara Falls electric companies have found that their market demands have exceeded their expectations. Over 100 Ontario municipalities are now supplied by the Hydro-Electric Power Commission; and in January, 1916, another reduction was made in electrical rates, resulting in the saving of from 3 to 20 per cent to consumers in about 60 municipalities. Rural customers—farmers and small rural consumers—now number some 700 to 1,000.

Last autumn, the Hydro-Electric Commission placed in operation its new plant at Eugenia Falls, Ont. It has an ultimate capacity of 8,000 horse-power, half of which is already installed. Ten or twelve municipalities are being supplied from this plant. Other municipally owned plants are to be constructed.

During the past year, the first Government-owned electric railway in Canada, the London and Port Stanley railway, was operated by the Commission. The first half year, ending December 31st, shows a gross revenue of \$145,737.84, a net expenditure of \$136,460.20 and net earnings of \$10,277.64. Freight appears to be the important factor in ensuring profitable returns for such roads.

Hydro-Electric Radial Railways In the municipal elections, in January, 1916, all the larger municipalities concerned, including the cities of Toronto, Stratford, Berlin and London, passed by-laws involving a possible expenditure of some \$14,000,000 to provide a Government-owned system of hydro-electric radial railways, the trunk line of which will run from Toronto to London. Such railway systems will require much additional power.

The facts above cited demonstrate the great economic importance to Canada of power like that obtained from Niagara. The larger portion of southwestern Ontario is now dependent for power and lighting on the hydro-electric developments at Niagara.

Problems corresponding to those associated with these Niagara developments, involving as they do the question of the exportation of electrical energy, are of vital importance to the whole Dominion, and are worthy of the best statesmanship which Canada can bring to bear upon them.

* Locally known as Chippawa creek.

INVESTIGATION BY INTERNATIONAL JOINT COMMISSION AT
LAKE OF THE WOODS

What is known as the Lake of the Woods investigation is being conducted by the International Joint Commission, under the Boundary Waters Treaty, of 1909, between Great Britain and the United States. The chief purpose of the investigation is to secure the most advantageous use of the waters of the lake of the Woods, and of the waters flowing into and from that lake on each side of the boundary, for domestic and sanitary purposes; for navigation and transportation purposes; for fishing purposes, and for power and irrigation purposes; and also to secure the most advantageous use of the shores and harbours of the lakes and the waters flowing into and from the lake. This object is sought to be attained by means of regulating the lake between certain desired levels.

Through the courtesy of the Commission of Conservation, and upon request by the Canadian Commissioners of the International Joint Commission, it was arranged that I would have whatever time was necessary to fully attend to the duties of this important investigation.

The total drainage area of the lake of the Woods is 26,750 square miles, of which 15,565 square miles, or 58.2 per cent, are in Canada, and 11,185 square miles, or 41.8 per cent, are in the United States. Of this 26,750 square miles, 3,960 square miles, or 14.8 per cent, is water area, of which seven-tenths is in Canada, and three-tenths in the United States.

**Inland Waters
of Canada**

As comparatively few persons have any adequate appreciation of the extent of the great inland water resources of portions of Canada, a few brief statements will be of interest.

The area of the Lake of the Woods basin, 26,750 square miles, is within five per cent of the area of the province of New Brunswick. It is greater than the combined areas of the states of New Hampshire, Massachusetts, Rhode Island, Connecticut and Delaware. Its water surface, 3,960 square miles, is, if we except the Great Lakes system, larger than the water area of any individual state in the United States. Minnesota is nearest with 3,824 square miles of water out of a total area of 84,682 square miles.

The area of the lake of the Woods, including Shoal lake, with 107 square miles, is 1,485 square miles. The area of Rainy lake is 345 square miles.

**Important
Water-power
Development**

The waters of the lake of the Woods eventually discharge into Hudson bay. Important water-power development has already taken place at its outlet, and also on the Winnipeg river. At the outlet there

are plants of the Lake of the Woods Milling Co., having an installation of about 6,000 horse-power, and flour mills with a capacity of 9,500 barrels per day; also the town of Kenora has a municipal plant of about 3,600 horse-power. On the Winnipeg river there are installations aggregating about 75,000 horse-power. There is about 290 feet of utilizable fall between the lake of the Woods and lake Winnipeg, with a potentiality, under controlled outflow, exceeding 400,000 horse-power.

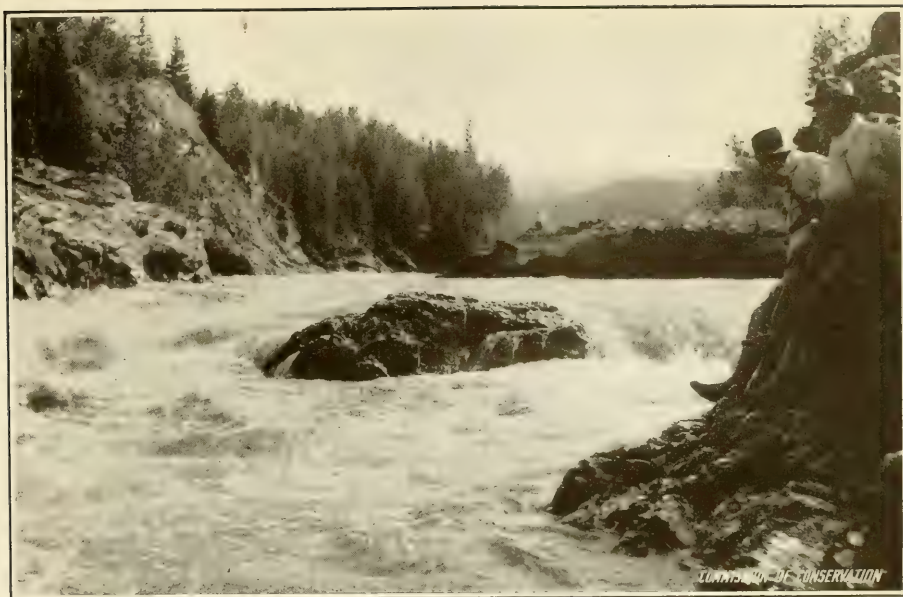
Value of Water Storage	To convey some idea of the enormous volume of storage available, a depth of one foot on the lake of the Woods is equivalent to 41,400 million cubic feet, while the corresponding volume for one foot of depth on Rainy lake is 9,600 million cubic feet. In other terms, a depth of one foot on the lake of the Woods would supply 1,313 c.f.s. for one year, while one foot depth on Rainy lake would supply 305 c.f.s. for the same period.
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It is obvious, therefore, that the storing of the runoff in Rainy lake, lake of the Woods and elsewhere, may be made to exert a marked beneficial influence upon water-powers receiving supply from this watershed. The International Joint Commission, in recommending regulation of the lake of the Woods, will consider the advantage which would result to power interests, and also take into account any disadvantages that may result to riparian owners living in Minnesota or elsewhere, whose lands, bordering on the lake, may, under certain prescribed regulation of levels, be subjected to damage by flooding.

WATER-POWERS IN BRITISH COLUMBIA

Although we have not been able to complete the report relating to the Water-powers of British Columbia, nevertheless, all possible effort has been, and is being, bestowed upon this work. It may not be amiss to remark that the other work, which has necessarily taken so large a part of our time, involves matters of great national importance, matters which affect all the provinces of Canada.

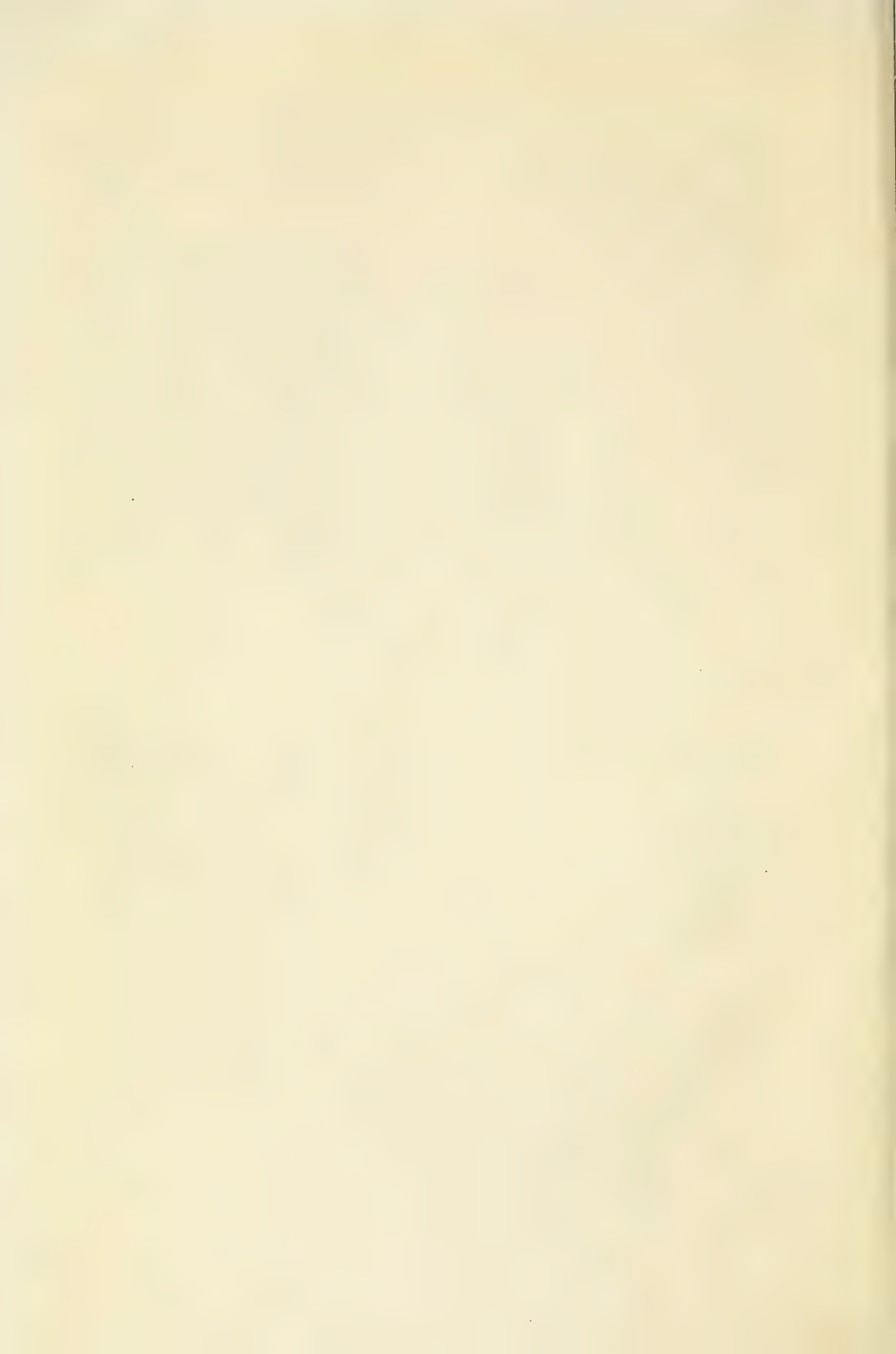
With the continued kind co-operation of various government organizations, which have greatly assisted by contributing data, it is planned that the hydrographic data shall, wherever possible, be brought up to the end of 1915. It will be appreciated, therefore, that, while the British Columbia report has necessarily been delayed, it will be up to date when published, and it is believed that, when issued, it will be of considerably more permanent reference value than could otherwise have been the case.



FIRST POWER SITE ON QUESNEL RIVER, BRITISH COLUMBIA
The rapids occur in a rock cañon about twenty-one miles from the mouth



RAPIDS ABOVE MOUTH OF KOOTENAY RIVER, BRITISH COLUMBIA
The river has a descent of over forty feet in approximately two miles



Fire Prevention

BY

J. GROVE SMITH

Canadian Fire Underwriters' Association, Toronto

ANY consideration of national waste must be incomplete so long as it ignores, or treats as of secondary importance, the destruction by fire of created values. The conservation of natural resources will be of no benefit if the wealth won from forest, field, and mine is to be devoured by fire. Is it not of vital importance that public attention should be directed toward conserving those developed resources which form the basis of our national credit? Upon the integrity of that credit rests the stability of the entire commercial fabric, and its impairment by fire imposes an immediate burden upon the whole of our people. The ravages of fire have grown appreciably less throughout the world with advancing knowledge of fire control, except in the United States and Canada, where fire loss is increasing year by year, and exceeds, per unit of population, the waste of any other five civilized countries combined.

Some Comparative Facts and Figures

The statement* which has been prepared, while an estimate only, gives a staggering figure as the amount of our annual fire loss. A few comparisons will give a graphic idea of what this fire loss means.

Taking the last Dominion census report of the number of employees engaged in manufacturing industries, this fire loss equals two per cent of their productive energy, which is as though we had an army of 12,000 men, fed, clothed and maintained in idleness by the remaining 98 per cent. Comparing it with our agricultural production, it represents nearly four per cent of the total value of our field crops, or, as if over 1,500,000 acres were eternally barren. If the assessment values of our cities are considered in this comparison, the loss is as though we destroyed every year all the buildings in Port Arthur and Fort William, or Brantford and Kingston, or one-half the buildings in Hamilton or Ottawa.

Every year the flames consume a value equal to 11,000 dwellings worth \$2,000 each and housing 50,000 people, or, in effect, more than all the dwellings in London, Ontario. These buildings placed each on a twenty-five foot lot would make a street with buildings

* Appendix III.

on either side extending a distance of over twenty-six miles. And every two hundred yards of that length represents a human life destroyed, as the direct result of our ignorance, indifference and inefficiency.

What is the remedy for such a condition? To diligently search for and find that remedy is more than a matter of wise economics. Because of the waste of life it assumes a humanitarian aspect of much importance.

Cause of Fire Waste	There are three great factors entering into the occurrence of all fires and the extent of loss resulting therefrom. These may be defined as physical hazard, moral hazard and temperamental hazard. Physical hazard is a term applied to latent characteristics inherent in combustible property and its use, such as poor construction, occupational hazards, heating, lighting, power and other causes easily discerned. Moral hazard comprises intentional fires, and these may arise from motives of revenge, from insanity, or, from the desire to secure unlawful gain by the destruction of insured property. Temperamental hazard is really a psychological study; it is the habit of the people, the state of mind which condones carelessness, is indifferent to its effects, and frequently denies its very existence. To this cause the immense number of fires in Canada can undoubtedly be ascribed. Were it possible to determine the exact number of fires caused by physical hazard, by recklessness and indifference, and by intention and design, conclusions of value would soon be arrived at. Fire, by its very nature, destroys the history of its origin, consequently, all efforts at accurate analysis and classification of causes must meet with failure.
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Investigation of Fire Losses	Three months ago, an investigation of the extent and causes of fire waste in Canada was commenced by this Commission. A survey of existing conditions, together with the suggestion of such remedies as may appear justified, will be incorporated in a report. The evidence submitted from all parts of the country demonstrates that building construction and improvement, fire protection and effective legislation are neglected to a shameful degree, while existing laws are, in the main, loose, unrelated, lacking in uniformity and without centralized authority for their proper enforcement. The enquiry also indicates that at least 75 per cent of the total number of fires in Canada is due to the gross carelessness and negligence of our people. Twenty per cent is, in all probability, started by those who wish to benefit at the expense of the insurance companies, and a bare five per cent originates through unavoidable accident.
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**Nature of
Insurance
Business**

The number of fires that occur has been purposely emphasized, rather than the amount of the loss, in Canada, because the former is of greater importance to an intelligent understanding of the situation than the monetary waste, and must form the basis of any effort toward fire prevention.

It is demonstrable that the attitude of indifference toward fire waste is, to a large extent, the natural outcome of fire insurance. From the point of view of the average man, to pay an insurance premium is to discharge his whole duty in the matter of his responsibility as to fire. The prevalence of this misconception explains the apathy of the public and the prominence of the insurance companies in all questions affecting safety against fire.

The most difficult task confronting any effort at fire prevention lies in securing general recognition of the elementary truth that, while the insurance companies may pay the loss, payment is made out of a fund taken from the public in advance. That fund is collected as a tax upon every commodity and is paid by the ultimate consumer. Moreover, the income of the companies must cover not only the loss to be indemnified, but at least as much, in addition, to cover cost of operation and profit. Up to the limit that the public will accept without protest, the higher the losses, the greater will be the premiums, commissions and profits accruing to the companies. To put it frankly, although conflagrations and excessive losses are feared, as upsetting averages and estimates, and are consequently guarded against, companies look with complacency upon frequent and moderately large fires. Fire prevention, on the part of insurance companies, would be a work of supererogation. Their interest lies, not in the prevention of fires, but solely in providing indemnity for losses and in protecting themselves against conflagration claims.

**Insurance
Companies and
Fire Protection**

Hitherto, we have looked almost entirely to the insurance companies in matters appertaining to loss by fire, and, to their credit, be it said, they have led every advance that has been made in the direction of improved building construction and fire protection. Recognition is due to Edward Atkinson, one of the early insurance engineers, for having instituted the first systematic investigation of fire losses. As a result of that investigation, which was carried out by the mutual companies of New England, more than a quarter of a century ago, we have, to-day, the mill-constructed or slow-burning building as a type of architecture, and the sprinkler system of fire protection, which safeguards some of our largest structures both in Canada and

the United States. Since then, the insurance companies have undertaken the scientific study of fire and the methods best adapted to its control. Associated through local underwriting boards, and affiliated with the National Board of Fire Underwriters, the National Fire Protection Association, and the Underwriters' Laboratories, they are, to-day, one of the strongest and best organized businesses in existence. From the Atlantic to the Pacific, building ordinances, materials entering into construction, electrical wiring regulations, waterworks systems and fire departments are recognized as being within the scope of insurance influence and activity. Through their system of schedule rating, which penalizes defects and gives credit for improvements made, the insurance companies have not only effected a betterment of insured properties, but have become, in a large measure, the arbiters of public fire safety. Appeals by citizens for increased water service, additional fire stations or equipment may be unheeded, but, let the demand come from the underwriters, and the authorities hasten to comply. It is recognized that failure to comply with their requests will be followed by increase of insurance rates. To-day, not only are insurance rates the paramount motive for the improvement of private property, but the ideals of civic responsibility for fire protection are largely measurable in terms of the companies' requirements.

**Results of
Fire Protection
Measures**

The question naturally arises as to the specific result of all the efforts that have been made to protect properties and communities from fire. The work has been well done, the methods of the insurance companies have become almost a science, and fire protection engineering is a recognized profession. Surely improved building construction and fire control should have effected some diminution in the destruction of property values.

Such, however, is not the case. Whether we study the annual reports of insurance companies and note the ratio of loss to insured value compared with ten, fifteen or twenty years ago, or whether, disregarding insurance entirely, we compare the figures of fire waste with our increase in wealth and population, the same conclusion will be reached. The percentage of loss in Canada is not decreasing, and, in all probability, will not decrease so long as we confine ourselves to the existing methods of dealing with the situation. Up to the present, our applications have been local and palliative, while the disease is epidemic. While concentrating our energies toward combatting the symptoms, we have entirely ignored the cause.

What, then, is to be recommended as a solution of the problem of fire waste? In the first place, well-considered measures are

urgently needed for the better regulation of building construction in Canada. Unregulated wood construction makes every incipient fire a potential conflagration, and its widespread use in Canada provides an obvious reason for our excessive losses, as compared with the losses in Europe.

**Structural
Conditions
in Canada**

Until the last few years, wood has formed the principal building material in Canada. The dangers of its indiscriminate use are not confined to the frame villages of the Eastern provinces and the mushroom towns of the West. In all of our larger centres, a survey of the buildings demonstrates that there are few solidly constructed streets. There is a certain percentage of brick buildings, and, occasionally, fire-proof structures, but, always and everywhere, sandwiched between them, are frame, roughcast and brick-veneer constructions. In the areas behind such buildings, and forming the centre of the blocks, wooden sheds and out-buildings will usually be found. The actual conditions existing may perhaps be more clearly gathered from the report of an insurance inspector, having reference to one of our largest towns.

"On one corner of two of the busiest business streets is a bank exposed in its rear to a lot of old wooden shacks, which may cause the destruction of the whole block.

"On another corner of the most beautiful street is a collection of old lumber and refuse, which has long threatened the existence of two churches and a number of dwellings houses. On a corner of another business street there has always been allowed a wooden construction, which menaces the safety of a number of comfortable dwellings, the roofs of which are below its level, yet the owners of these dwellings are without recourse.

"On a corner of two residential streets there stands a set of apartments, constructed of materials so flimsy as to surprise one that it stood erect until it was enclosed. Below the level of another street is a sawmill with its appurtenant buildings, its piles of lumber and firewood, all dominated by a cluster of wooden buildings, one of which is an old shack with sewer pipe for a chimney. Alongside of some of these piles of lumber and firewood are a number of shacks with pipes through their roofs instead of brick chimneys, yet the mill-owners are powerless. In the frame buildings, the unobstructed spaces between the studs and between the joists constitute flues which conduct fires originating in basement or lower stories, all over buildings."

Such conditions create the conflagration hazard, and no place in Canada is free from it. Given a fire of fair proportions, and a favourable wind, any of our cities or towns might be swept away, but for the protection provided by our municipal fire departments.

Minimum Building Code Recommended	The Commission of Conservation should recommend to the provinces the adoption of a standard minimum building code. It should formulate a code that would be elastic enough to be applicable to every city and town in the country. The several provincial governments might then be influenced to endorse this code and to enforce its application, thus ensuring uniform municipal building regulations throughout the Dominion.
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Included in this code should be recognized Canadian standards and tests. To this end, the Dominion Government should establish a Bureau of Standards, for the testing of all materials, devices and appliances used in building construction, electrical construction and fire protection, and for the promulgation of standards relative thereto. The establishment of such a bureau would meet with approval throughout Canada and would remove the suspicion with which architects and builders view private standards and tests.

We have, at present, building ordinances in all the cities and many of the larger towns in Canada. Without exception, it can be stated that they are all imperfect. Many are obsolete and constitute a mass of disordered, undigested and conflicting rules. In the matter of fire danger, proper safeguards have been neglected. Take, for instance, the question of retarding the spread of fire. Every city by-law provides for the cutting off of certain maximum areas by fire-walls that must run solidly to the roof and extend above it. Thus the lateral spread of fire is safeguarded. No by-law, however, effectively regulates the protection of floor-openings. A row of three-storey brick buildings, covering a ground area of 75 feet by 150 feet, with six interior partitions of wood and plaster, would be regarded as a veritable fire-trap and would not be permitted by any modern ordinance. Suppose, however, that this block of buildings is turned on end, so that it becomes a seven-storey building, and that the former partitions, which have now become floors, are cut through for the accommodation of stairways, elevators and shafts; its erection would proceed without protest, and, in all likelihood, be pointed to with pride. Yet the latter building is far more susceptible of destruction by fire than the former. Fire always spreads more rapidly in a vertical than in a lateral direction, and 90 per cent of all fires that extend from building to building in our cities go up the stairways, chutes and elevator openings of the buildings in which they originate, and out through the roofs, communicating therefrom to adjacent structures. If, by proper regulation, this hazard can be eliminated, it is a matter of immediate public concern.

One of the chief reasons for the adoption of a uniform building code in Canada is that the principles of building construction and fire protection are universal. Spruce and Douglas fir are just as strong in New Brunswick and Nova Scotia as in British Columbia and the Prairie Provinces, floor loads ought to be the same, methods of fire protection should be similar for buildings and districts of the same character. Local considerations do not enter into the question, and there is no reason why the by-laws of the various cities of Canada should differ. Moreover, if regulations are necessary for the larger cities, they are equally necessary in the smaller towns and villages.

**Fire Marshal
Act Required**

In the second place, a Fire Marshal Act should be passed and a fire marshal appointed in each of the provinces in Canada. At present, we have such an Act in force in Manitoba, Saskatchewan, British Columbia and Ontario. The regulations in each are enforced by special departments, except in British Columbia, where the administration of the Act is under the Superintendent of Insurance. Quebec has an Act for the Prevention of Fires, and under its provisions, the Commissioner and other officials are subject to the authority of the Dept. of Public Works and Labour. The Quebec measure, however, does not appear to have been actively enforced since its enactment in 1912.

The work of a fire marshal is divided into two parts. One is the recording of fires and their causes, the inspection and removal of fire danger conditions, and education of the public in methods of fire prevention. The other has to do with the investigation of fires of suspicious origin and the prosecution of incendiaries. In addition, a proper Fire Marshal Act provides a means of bringing together and enforcing all legislation affecting the fire hazard.

An illustration of division of authority and responsibility in regard to the enforcement of our laws, is provided by a case that occurred in Toronto in 1914. The Woodbine hotel was destroyed, causing a loss of over \$150,000 and several lives. Following the fire, a question was raised as to the external fire escape running off private rooms; this appeared to be in contravention of the provincial Act. The Factories Inspection Branch disclaimed jurisdiction over fire escapes, excepting upon factory buildings. The city architect said his department was not responsible, but thought the fire chief had control over safety devices on buildings. The fire chief claimed no authority beyond the fact that he and the city architect, when the fire escape was erected, told them which way to run it on the building. He thought the matter of fire escapes on

hotels was governed by the provincial licensing board. The Provincial License Commissioners stated that the initial responsibility for construction and fire escapes lay with the city architect, but that they could refuse a license, after the erection of the hotel, if they considered it dangerous. It was thus found that there was really no authority in the province having jurisdiction over fire escapes upon hotel buildings, or any other class of building, with the exception of factories employing a certain number of hands.

Another incident will illustrate the conditions that may exist, even when legislation has been especially provided as a remedy. A year or two ago, six Toronto theatres were inspected unofficially under the direction of the Toronto Bureau of Municipal Research. Three of these were found in a condition dangerous to human life and none conformed to By-law No. 6,401. These theatres were presumably inspected periodically by the Fire Dept., the Public Health Dept. and the License Dept., yet such conditions were possible.

It is to remove these and the similar conditions which obtain in almost every city and town in Canada, that an adequate Fire Marshal Act is recommended. In and through his deputies, the fire marshal should be given all existing powers, wherever they may be now vested, to issue licenses for buildings, to grant permits for combustible and explosive substances, and to control the operation of cinematographs, etc., in public halls. He should have authority to enforce all existing statutes, ordinances, and by-laws relating to fire and fire prevention; to require the installation of fire-extinguishing equipment in such buildings as he deems necessary, and the inauguration of fire drills in factories, hotels, mercantile establishments, schools, hospitals, infirmaries and theatres. At present, laws and ordinances relating to protection of life and property from fire are scattered through many municipal and provincial departments. Officials are expected to enforce such regulations without due consideration being given to the activity of outside influences. All fire prevention and fire protection legislation should be codified and the fire marshal alone should be held responsible for its enforcement.

**Standard
Municipal Fire
Protection**

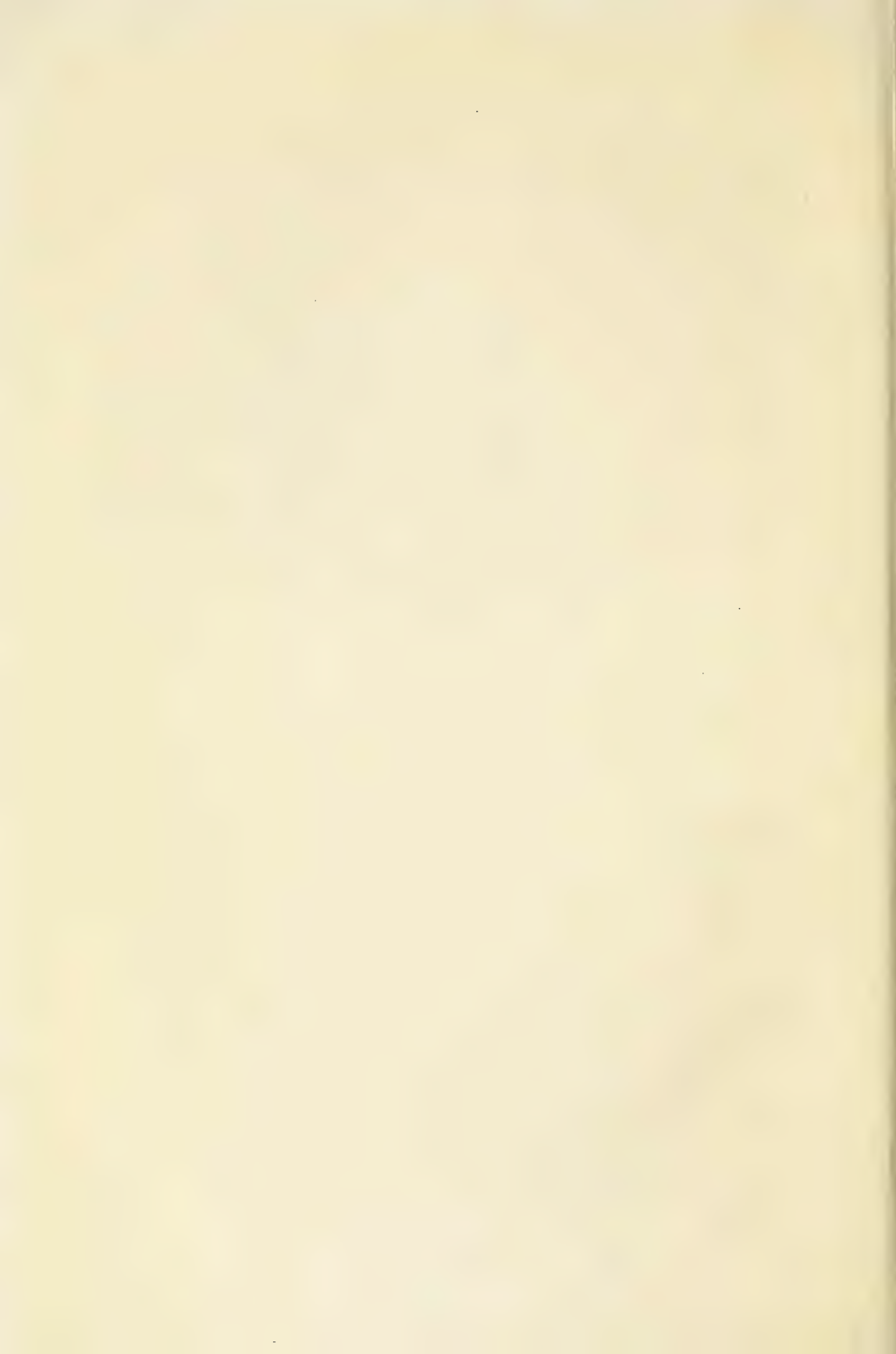
A third suggestion is that graded standards of municipal fire protection be established for Canada. At present we have no standard other than that of the Canadian Fire Underwriters' Association. Every town should be classified according to its population and certain measures of protection and equipment should be provided in that town. Every fire chief should bring his department up to this standard. The necessity of adequate water supplies and efficient fire departments



BOY SCOUTS INSTRUCTED IN FIRE PREVENTION
Fire Chief Heath, of Saskatoon, takes this means to lessen fire waste in that city



DOMINION PARKS BRANCH PORTABLE FIRE ENGINE; READILY CARRIED BY TWO MEN



requires no argument. Familiarity with buildings in which they may be called upon to fight fire, the situation of exits, stairways, fire-walls and other features of construction, all increase the efficiency of the department. In addition to the adoption of standards of fire protection, it is suggested that every paid brigade be urged to institute inspection of all manufacturing and mercantile properties within its limits, and to make provision for such in its regulations.

**Advisory
Department
Urged**

A fourth suggestion is that a central department be established for the purpose of co-ordinating the various activities in regard to fire prevention and protection. As its functions would be strictly advisory, this department might well be under the direction of the Town Planning Branch of the Commission of Conservation, with which the work of fire protection has so much in common. Such a department would provide an authoritative source of information respecting improvement of municipal fire protection, protection in factories and buildings and fire prevention generally. In co-operation with the provincial fire marshal, an aggressive publicity campaign should be directed toward the education of public opinion to a proper conception of the fire waste. The fact that new fire prevention legislation is being suggested presents the strongest argument for defining the problem so that the average man can understand it. No law can be made truly effective without the support of public opinion. The creation of that opinion is the work of a special department which, through Boards of Trade, Chambers of Commerce and other existing associations, would seek the attention and interest of every property owner in the country. We can educate the pupil in our schools, because we can compel him to go to school, but we cannot educate the adult in the same way. We have to show him that an evil exists, and that the remedies suggested will be to his personal benefit. Unfortunately, we have not yet reached that altruistic ideal where the picturing of our deplorable fire waste, as a national and ethical wrong, strongly affects the individual.

**Insurance
Agents and
Fire Prevention**

In an address delivered by Mr. Franklin H. Wentworth, before the Insurance Agents' Association of Ottawa, he stated that agents, as representing the insurance companies, were the logical educators of the public in regard to fire waste, and should advocate improvement of properties and the installation of adequate fire-protection facilities. This is a dubious proposition. An agent cannot be expected to exert himself on behalf of a client when such action injures his own interests. Under the present system of schedule rating, defective conditions of

a risk increase the premium and improvements decrease it. As the agent receives remuneration upon a commission basis, which is a fixed percentage of the premium charged, what is more natural than that he should be indifferent to the removal of fire producing conditions. It is too much to expect that men should devote their time to the study of comparative fire hazards, or energetically endeavour to instruct the public in the elimination of fire dangers, when the more expert they become the less income they receive. Every time a defective condition is removed, or an improvement secured which gains for the property owner a reduction in premium of \$25, it costs the agent at least \$5 in loss of commission for his activity. A city composed of fireproof buildings, in which fires seldom occurred, would offer poor opportunities for insurance agents or companies. The insurance business is not philanthropy, it is a cold-blooded business proposition, and, consequently, more should not be expected than is already being given by both companies and agents as a matter of business expediency.

**Failure of
Present
Methods**

This brings us to the point at which the whole situation can be reviewed and a final suggestion made for effectively dealing with the fire waste. So far as education is concerned, it will accomplish very little without concurrent legislation. Mr. Wentworth will bear me out in saying that all the means employed up to the present time in the United States have proved absolutely futile in the reduction of fire loss. During the last ten years, the staff of the National Fire Protection Association have been zealously delivering their message, the insurance companies have been applying their schedules for the improvement of properties, and the public has acted upon the advice given; stricter building ordinances have been established and regulations enforced in regard to every conceivable cause of fire; fire departments have reached a very high state of efficiency; over forty fire marshals hold office in as many states and provinces, and their work is well worthy of praise; fire prevention days and clean-up days have become established institutions and essays on the fire waste are a part of the ordinary curriculum of the public schools. Meanwhile, the fire waste continues, and the net result of our misdirected activity is that 8,000,000 Canadians continue to bear the cost of 8,000 fires annually, and the 8,000 individuals having fires continue to divide the responsibility with their 8,000,000 fellow citizens.

The more closely the situation is analyzed, the more apparent does it become that the prevailing indifference to fire is due largely to the ease with which personal responsibility can be shirked. The facilities provided by insurance for the distribution of the loss have

insidiously undermined that carefulness. In the majority of cases, an ordinary fire involves no loss and often constitutes an actual gain to the individual. We are frequently misled upon this point by newspaper reports of large fires where the insurance is said to be insufficient to cover the damage. Every underwriter knows that, for each such case, hundreds of losses are adjusted and paid in full by the companies.

The record of last year shows that, in Canadian cities exceeding 10,000 population, an average of 98 out of 100 fires were confined to the building in which they originated, and that 95 per cent of all losses were fully compensated by insurance. In only one fire in twenty did the owners of property bear any proportion of the loss, and these were confined to the larger fires, properties insured under a co-insurance clause, and small uninsured losses. While the exact figures may vary from year to year and in different localities, it is undoubtedly a conservative estimate that from 90 to 95 per cent of all losses in protected cities are fully indemnified by insurance.

This means that, in nine out of every ten fires, a possible advantage results to the property owner. Out-of-date furnishings and unsaleable merchandise are converted into ready cash. The censure and opprobrium that attach to defaulted accounts can be exchanged for active sympathy and extended credits. With this situation, is it any wonder that the mental attitude ranges from unconscious indifference to premeditated arson? The careless owner of property, insured beyond probable loss in any one fire, is blind to the danger in accumulations of rubbish and defective structural conditions. Only a step removed is the criminal purpose that does not hesitate to use insurance as an easy way out of financial difficulties. Underlying the whole situation is the significant fact that, by paying fire losses in full we are offering a premium for their occurrence.

Recently the problem of enforcing greater individual responsibility has received considerable attention, and two methods have been suggested for dealing with it. One is the enactment of a neighbouring liability law, following the Code Napoleon, which would make the owner of property in which fire occurs liable for all damages caused to others as a result of its spreading. The other suggestion is to charge against all fires the cost of their extinguishment. These measures, worthy as they are of consideration, appear to be little more than an evasion of the real issue. In the first place, not more than two per cent of all fires in cities extend beyond the place of their origin, and the additional liability, where it existed, would be quickly covered by a new form of consequential loss insurance. The alternative suggestion of charging fire department costs against

the owner of property in case of fire, carries with it the danger that, to save immediate personal expense, the calling of the brigade may be delayed until the fire assumes proportions that will ensure the charges being more than covered by the insurance indemnity to be received.

The problem can be met, however, by the addition of a very simple provision to our present insurance policies, whereby the owner shall himself bear a specified percentage of the amount of loss. If this be done, insurance will still serve its real purpose of protecting a property owner against serious loss, but he will no longer have, as at present, the feeling of security that engenders indifference and carelessness. The fundamental principle involved has been approved in other branches of insurance, notably, in the exception of the first week of injury from payment of workmen's compensation. Through a reduction of insurance rates equal to the percentage of loss exempted from indemnity, and a further advantage in the decrease of fires which would inevitably follow, its application to fire insurance would result in an immediate public benefit.

**Regulation of
Insurance**

As a final suggestion, therefore, I would urge that the Commission of Conservation use its influence to secure the uniform amendment of the Insurance

Acts now in force in Canada, as follows:

1. Any policy or contract of insurance to be invalid when issued without the written signed application of the assured or his or their duly appointed agent.
2. The liability under any policy to be limited to 80 per cent of any loss occurring on the property covered, not exceeding the sum insured; and in case of other insurance, each policy to bear only such percentage of the 80 per cent of loss as its face value bears to the whole amount insured.
3. Further insurance without due notice to companies already insuring to make void all previous insurance.
4. A duplicate of each proof of loss to be sent to the fire marshal of the province in which the loss occurs, and all insurance payments to be made subject to the signed authorization of the fire marshal.
5. No adjustment of losses under insurance policies to be made except by adjusters licensed by the fire marshal department of the province in which the loss occurs.

It will, no doubt, be contended that these measures are revolutionary and, if made compulsory, will necessitate a readjustment of existing business methods. The immediate step, therefore, appears to be a public agitation and discussion of the subject, that ultimately

fire insurance may be placed on an absolutely sound social basis and so contribute directly to the elimination of the fire waste. It is unthinkable that a business affecting the whole economic fabric should be longer degraded from its preservative functions to provide a means by which the ignorant, the careless and the criminal may flourish at the expense of other men. The conception is slowly taking shape that fire insurance has an inherent duty beyond that of mobilizing to-day's earnings against to-morrow's misfortune, a duty of efficiently protecting the community against impoverishment by individual negligence and crime. Proper recognition of that responsibility may be the deciding factor as to its continuance under private control, when the public is fully awake to the true significance of our loss by fire.

Report of the Committee on Waters and Water-Powers

BY

LEO. G. DENIS

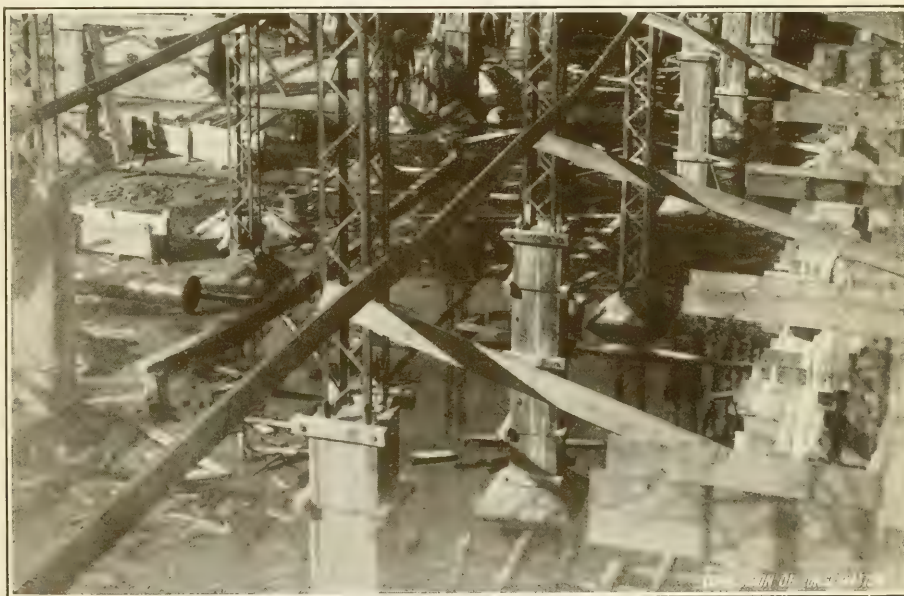
Hydro-Electric Engineer, Commission of Conservation

DURING the past year attention was devoted to the completion of two important reports. The first of these, on the *Water-Powers of Manitoba, Saskatchewan and Alberta*, had already reached an advanced stage, but a considerable amount of additional information, which has become available during the year, has been added. Much of this additional information was obtained through the Water Power Branch of the Department of the Interior investigating water-powers in the Prairie Provinces. The report contains a comprehensive description of practically all the rivers which have been surveyed or explored in this portion of the Dominion and which offer water-power possibilities. Gauging stations have also been established on many of these rivers, to obtain accurate and continuous data respecting the flow at different times of the year, and tables, showing at a glance its history in this respect since observations were commenced, are included under each stream. The more northerly rivers are also described in all the details which available data permit. Particular attention was given to information from a water-power viewpoint, such as description and descents of rapids, and nature of the banks and beds of the rivers.

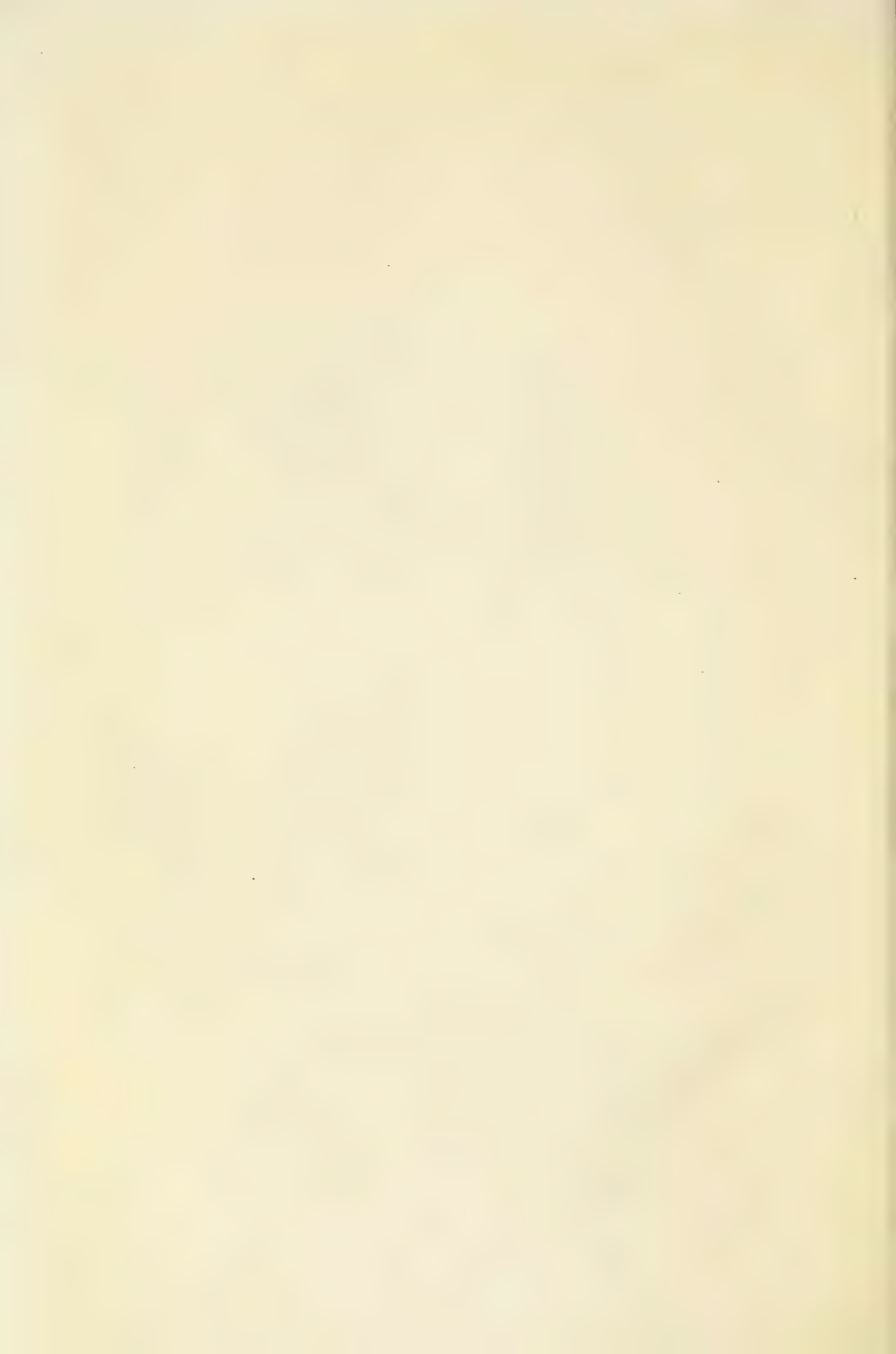
Information of Water Power Possibilities	A feature of this report, which will be of interest to those desiring to obtain a general idea of the water-power possibilities, without entering into detailed descriptions, are the tabulated statements appearing as appendices I, II and III and the accompanying map of reference. Practically all the power sites, falls or rapids referred to in the text, and upon which fairly definite information is available, are enumerated in a concise form for ready reference. The rivers are grouped into three classes, graded according to available data, each appendix covering one class. Under the first are the Saskatchewan river and tributaries and other streams flowing into lake Winnipeg, enumerating 121 power sites, for all of which fairly dependable information as to flow and descent is available; particularly is this so of the Winnipeg
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REGINA SEWAGE DISPOSAL WORKS. COMPLETED FILTER UNIT ENCLOSED



REGINA WATERWORKS. CONSTRUCTION VIEW OF STORAGE RESERVOIR.
CAPACITY 5,000,000 GALLONS



and Bow rivers, which have been carefully surveyed. The second includes 116 rapids or falls on rivers for which complete data on flow are not available, but where it has been possible to estimate this during the open season. The third gives descents of 53 rapids or falls, but no attempt is made to estimate the flow. The report is fully illustrated, including many sketch plans and diagrams.

**Water Works
and Sewerage
Systems**

The report on *Water-Works and Sewerage Systems of Canada* will shortly be ready for distribution. It is an enlarged and revised edition of the report on *Water-Works of Canada*, published in 1912, and contains short descriptions of all water-works and sewerage systems in the Dominion. This report is also fully illustrated. Under Part I, some 528 water-works plants are covered, while the sewerage systems and treatment plants in 279 municipalities are described in Part II. Several tables, compiled from the data in the report and summarizing points of special interest, are included. The subject of sewerage and sewage disposal is given more space than in the previous edition, and an introductory tabulated statement shows how serious the question of stream pollution is becoming in Canada. This shows the great number of our inland waters receiving raw or untreated sewage; particularly is this the case in the eastern portion of the Dominion, while in the west we have the excellent example of the province of Saskatchewan, where 80 per cent of the sewerage systems have treatment plants. The supply of water to communities is universally recognized as the most important function of inland waters, and, if grossly polluted, they become a great menace to water supply systems drawing water therefrom. This may be the case even where filters are employed, as a grossly polluted source of supply may overload the filter, which latter should only be regarded as an additional factor of safety in an operation which should begin with the proper treatment of the sewage before it is discharged into any body of water.

Several articles and short reports have been supplied during the year, either on our own initiative or in answer to special requests. Among the subjects which have created much interest is the use of hydro-electric energy in the manufacture of chemical fertilizers, and in replacing coal or other fuels in electric cooking.

**New Water
Power
Enterprises**

Although there was not a very large increase shown in Canada along the lines of new water-power enterprise during the year, a few are to be noted. Winnipeg has added some 13,000 h.p. to its municipal plant at Point-du-Bois. The Laurentide Power Co. has inaugurated its

new hydro-electric development at Grand'mère on the St. Maurice river, the ultimate capacity of which is to be 125,000 h.p. The Eugénia Fall plant, on the Beaver river, has been placed in operation by the Hydro-Electric Power Commission of Ontario, with an initial capacity of 4,500 h.p., under the relatively high head of 540 feet. This plant forms a part of the Commission's system which now covers practically the whole of south-western Ontario. The Hawkesbury Electric Light and Power Co. has completed and put in operation its new hydro-electric plant at Bell fall, on the Rouge river, 5,000 h.p. being developed, under 60 feet head. Among the new projects proposed during the year may be mentioned that of developing 600,000 h.p. at the Grande décharge of the Saguenay river, with the object of manufacturing chemical fertilizers. Another is the revival of the scheme to develop power on the Niagara river at the gorge below the falls. An estimate of 2,000,000 h.p. has been suggested in connection with the scheme, which, if carried out, should have the good effect of discouraging further attempts to increase the diversion of water from the falls. The development would be an international one; therefore Canadian interests should be closely safeguarded, as, so far, we have not always been the greater beneficiary in developments of boundary waters.

LA LOUTRE RESERVOIR

The St. Maurice river is the largest entering the St. Lawrence between Montreal and the Saguenay. With a drainage area of over 16,000 square miles, it possesses many important water-power sites, three of the largest being already utilized at Shawinigan fall, Grand'mère and La Tuque. Both the developed and latent powers on this river are of great value, not only on account of their large capacity but also from their geographical position. The Quebec Streams Commission, realizing the great benefits which accrue from conservation storage of the upper waters of the St. Maurice, selected it as one of the first rivers to receive their attention.

After careful studies, it was decided to establish the main reservoir at La Loutre rapids, 38 miles in an air line north of the National Transcontinental railway, at the lower end of a long intricate chain of lakes.

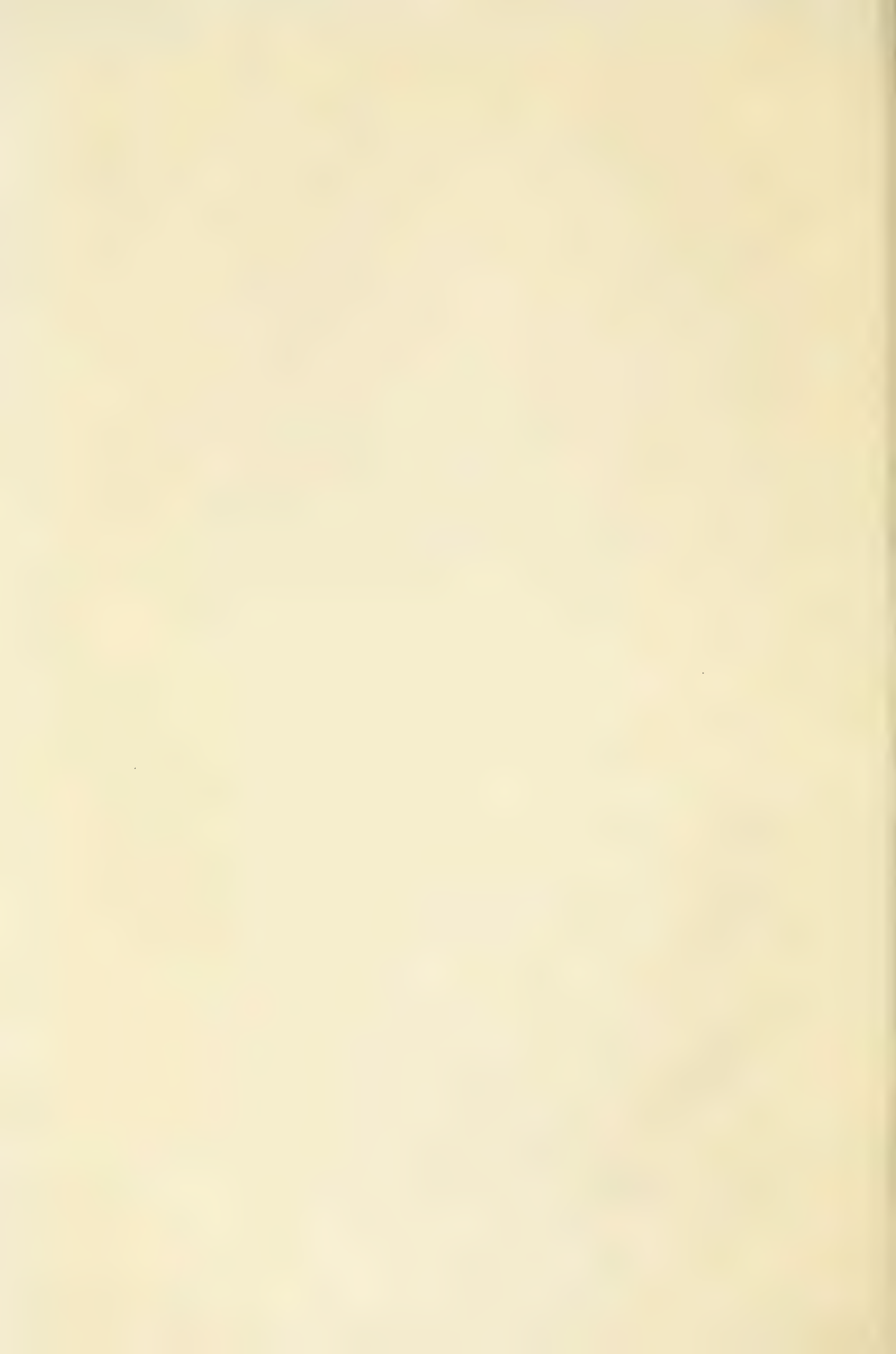
It is of special interest, inasmuch as it will be the largest reservoir in North America, and the third largest in the world, being exceeded by the Assuan reservoir, on the Nile, 3,750,000 million cubic feet, and the Gatun lake, at Panama, 183,000 million, as compared with the La Loutre, 160,000 million. The next largest in North America



ST. MAURICE RIVER STORAGE, LA LOUTRE RESERVOIR DAM-SITE, EAST CHANNEL



ST. MAURICE RIVER STORAGE, LA LOUTRE RESERVOIR DAM-SITE, WEST CHANNEL



is the Elephant Butte reservoir in New Mexico, with an eventual capacity of 115,000 million cubic feet.

The dam site is in entirely unsettled country, and, by the shortest available route, is 50 miles distant from Weymont and Parent, the nearest railway stations.

The material for the dam, aggregating 25,000 tons, will be transported 30 miles by water on the St. Maurice, and by a construction railway for the remaining 20 miles.

The dam is to be 1,720 feet long, of four straight sections, with 851 feet of spillway. Among the notable features are a movable sluice for logs and rubbish, a long measuring weir, and means for heating the gate chambers by hot blast pipes. Test borings having shown solid rock underlying the site, the plain gravity-type dam built of cyclopean masonry was selected, the profile allowing for an assumed ice pressure of 50,000 lbs. per linear foot acting at the overflow weir level. Comparing the size of the dam with the enormous capacity of the reservoir created, the advantages of the location are shown in an extremely favourable light; the quantity of concrete needed is 70,000 cubic yards and the capacity,—160,000 million cubic feet—a unit figure of 0.44 cubic yard of concrete per million cubic feet as compared with 4.78 cubic yards of concrete per million cubic feet for the Elephant Butte dam.

With regard to the benefits derived from the construction of this immense reservoir, the 160,000 million cubic feet stored represent a flow of 12,345 sec. ft. for 150 days or 6,172 sec. feet for 300 days. From this additional supply, the present minimum flow of 6,000 sec. ft. in the river could be raised to 15,000 sec. ft. at Shawinigan, leaving an over-supply in a very low year. But it was decided to regulate for only 12,000 sec. ft. flow, in order to allow for loss of water in the long distance of 220 miles over which the water has to flow to Shawinigan and to meet needs for floating logs at times when such water is not needed for power.

Between the reservoir and the mouth of the St. Maurice, there are no less than 17 power sites with heads of from 10 feet to 150 feet and whose aggregate descents total 800 feet; this figure would be increased to at least 900 feet by the dams erected in developing the various sites. This represents a total capacity of approximately 350,000 theoretical h.p. under present conditions, while it is estimated that some 900,000 h.p. will be available when the flow is regulated from the reservoir. At Shawinigan, Grand'mère, and La Tuque alone, the three sites at present utilized on the St. Maurice, the potentiality will be raised from an aggregate of some 190,000 theoretical h.p. to over 400,000 h.p.

Provinces
Co-operate

It is gratifying to note that, in practically all the provinces, systematic investigation and adequate regulation of water-powers have been provided for. Nova Scotia joined in this most important work during the past year, when, in accordance with a recommendation of the Committee on Waters and Water-Powers, a co-operative arrangement between the Dominion Water Power Branch and the Provincial Water Power Commission was inaugurated. Much excellent progress has already been made, practically every power-producing river has been covered by reconnaissance investigations, and 25 permanent gauging stations have been established. It is understood that tentative negotiations are under way towards a similar arrangement with New Brunswick.

Standardize
Information

The officials of the various federal and provincial organizations dealing with waters and water-powers are making an effort to co-ordinate, systematize and standardize their work. It is further proposed to publish all hydrographic data throughout the Dominion in a uniform manner, easily accessible to interested parties, as soon as possible after the information is obtained. Under present conditions much valuable information is sometimes buried in voluminous publications or reports dealing with perhaps four or five other subjects, and published a year or two after the data have become available.

The Dominion Water Power Branch has recently completed the power and storage investigations on the Winnipeg river, and now has a comprehensive conservation and power development scheme. In connection with the latter the Superintendent of the branch was recently authorized to spend \$100,000 on the recovery of land dominating undeveloped power sites.

Lake of the
Woods
Watershed

In this connection it is regrettable that the recommendation made two years ago by the Conservation Commission, with regard to the setting apart of the Lake of the Woods watershed as a forest reserve, has never been acted upon, and it is hoped that action will be taken during the year.

Report of Committee on Fisheries, Game and Fur-Bearing Animals

BY

OLIVER MASTER

Assistant Secretary, Commission of Conservation

DESPITE the continued handicap imposed by the lack of a staff expert, much useful work has been undertaken during the past year and a strong effort made to devote due study and attention to every phase of the committee's wide sphere of activity. It is especially gratifying to note that the work of previous years has borne good results along various lines.

Reservation for Sea Birds

Following the address delivered by Dr. John M. Clarke at the last annual meeting, and the representations of others interested, steps have been taken by the Commission to secure the permanent reservation of the gannet ledges of Bonaventure island as a secure breeding place for these birds. Under the proposed arrangement, the present property owners will cede a sufficient strip of land abutting on the ledges, in return for the erection of a substantial fence. Provision will also be made for adequate protection by a resident warden. As soon as the necessary transfers of property can be effected, arrangements for proper supervision will be concluded. Further measures to protect seabirds are urgently needed, for economic as well as scientific and sentimental reasons. This necessity has recently been brought to the attention of the Commission, especially with regard to the bird life of the north shore of the gulf of St. Lawrence.

Migratory Bird Treaty

Gratifying progress has been made during the past year with regard to the consummation of a migratory bird treaty with the United States, an arrangement which has had the endorsement and active support of the Commission from the outset. With the exception of British Columbia, the provinces, which have exclusive jurisdiction respecting the protection of wild life, have agreed to take the necessary steps to harmonize their respective laws with those embodied in the proposed international regulations; it is not probable that the objections advanced by British Columbia will prove insuperable. To facilitate action, it is now necessary to place the concrete proposals before the Provincial Parliaments at their next sessions.

Conference of
Committee

The most important work of the year was a conference of the committee at Ottawa on November 1 and 2. As a result of its deliberations, the following resolutions were passed, to be placed before the present meeting for the endorsement of the Commission:

(a) Resolved, that the committee commends very earnestly to the Dominion and provincial authorities, who are charged with the conservation and improvement of Canadian fisheries, the question of providing opportunities for vocational education suitable for those engaged in the industry; and

Resolved, further, that the committee most respectfully recommends the institution, as soon as practicable, of simple demonstration stations, the employment of competent traveling instructors, and the distribution of well-illustrated bulletins dealing with the practical problems arising from fishery occupations.

(b) Resolved, that the committee learns with satisfaction of the action of the Dept. of Fisheries, in increasing the number of whitefish fry planted in the Great lakes, and hopes that the number may be increased to that suggested as sufficient by the best authorities, namely, 20,000 per square mile of whitefish area.

(c) Whereas, the committee heartily approves of the efforts now being made for the preservation of North American migratory birds, some of which are seriously threatened with extinction, and learns with satisfaction the attitude of the provincial governments in this connection. Now, therefore, be it

Resolved, that the good offices of the Dominion government be solicited to negotiate a convention for a treaty between Great Britain and the United States, for the purpose of securing more effective protection for the birds which pass from one country to the other.

Conservation
of Game

A number of valuable addresses, dealing with a wide range of subjects, were delivered, and a report, containing the proceedings in full, will be published shortly. A feature of the meeting was the attention paid to game conservation; in previous years the committee had concerned itself chiefly with fisheries problems. Much useful information was placed before the committee with regard to bird protection, the sale of game, the protection of the big game of the Rockies, the fur-farming industry, and game preservation as practised in Dominion parks. In connection with the part of the program devoted to fisheries questions, discussion centred on the possibilities for securing more efficient development. Vocational training for fishermen, the

development of unutilized resources, the improvement of marketing methods, and the solution of other commercial difficulties which confront various branches of the fishing industry, were dealt with by well-known authorities. It is confidently expected that the new Fisheries Inspection Act, when the trade has become thoroughly familiar with its working, will, to a great extent, remove the serious handicap under which the industry has laboured as a result of unsatisfactory packing and curing methods and the absence of standard packages. This Act, supplemented by an adequate system of vocational instruction, should overcome the chief difficulties which have for years retarded the progress of the fishing industry.

**Development
of Fisheries**

The report of the Dominion Fisheries Branch for last year records a total production valued at about \$31,000,000, a decrease of \$2,000,000 in round numbers. The salmon pack on the Fraser river decreased heavily, accounting for the decline of over \$2,000,000 in the British Columbia output. Nova Scotia also showed a decrease, which, however, was more than offset by New Brunswick's substantial gain. The salmon, lobster, herring, halibut and mackerel were the principal commercial species to decline in yield, as compared with the previous year; the catches of haddock, cod and sardines were well above those of 1913-14.

**Increased Use
of Fish as Food**

The Commission has continued to add its efforts to the general endeavour to popularize the use of fish as a staple food, instead of as an occasional change of diet. How the home market can best be utilized is a matter for the most careful consideration of fishing interests, official and private, not only under the present abnormal circumstances, but equally so when normal conditions return. Heretofore no opportunity has been lost to place Canadian fish products on foreign markets; the export trade has been prosecuted vigorously. Within the past year the British and Australian markets have been invaded. Such commercial enterprise merits the highest commendation, particularly so when it serves also to relieve a national necessity, such as the present fish shortage has caused in Great Britain. But the cultivation of overseas trade seems to be emphasized at the expense of domestic possibilities, and without due appreciation of the unique position already occupied by our fishing industry with regard to export business. Last year, foreign markets took approximately 62 per cent of our fisheries products—a much greater proportion of the total output than was contributed to the channels of foreign trade by any other branch of industry—and it is by no means evident

that the domestic demand has reached its maximum. Although returns indicate that the fisheries net Canada annually a handsome favorable balance of trade, the extent of foreign markets does not fully compensate for their instability as compared with the home market. Neglect of domestic possibilities in favour of foreign results in an economic loss to the community at large, and ordinarily lessens the stability of the industry concerned.

DR. C. C. JONES: The committee has no doubt accomplished much more in the past year than in the previous year, and in that connection I wish to thank the officials of the Commission for their very great assistance to us, and also the officials of the Federal Department of Marine and Fisheries. I desire also to express our thanks to Dr. C. Gordon Hewitt for the very generous aid he has given us in our work along the line of game protection and preservation of wild life in Canada.

Report of Committee on Press and Co-operating Organizations

BY

JOHN DIXON

Editor, Commission of Conservation

DURING the past year the publicity work of the Commission has been mainly along lines similar to those followed in previous years, but has been extended to partly cover the recommendations of the last annual meeting.

As a result of the Dominion-wide campaign for greater production, inaugurated by the Department of Agriculture, public interest in the conservation of natural resources has been greatly stimulated. There has been an increase in the number of requests for the reports and publications issued by the Commission, as well as in the use by newspapers and periodicals of the information supplied by the Commission through the monthly bulletin, *Conservation*, and the quarterly, *Conservation of Life*.

Conservation has been published monthly throughout the year. The issuing of a French edition was commenced and has been favorably received. The circulation of *Conservation* has been extended to include the principals of all collegiate institutes, high and secondary schools, public school inspectors and educational officers. The circulation is at present 12,000.

Conservation of Life has been issued quarterly. It has been utilized almost exclusively as the publicity medium of the Town Planning Branch and has been largely in demand.

Special bulletins are issued to newspapers as occasion may arise, and are widely used. The cuts which appear in *Conservation*, *Conservation of Life*, and in our various reports are loaned to the press for use in their columns.

Last spring a special bulletin was issued to the rural clergy, suggesting and asking their co-operation, through special sermons, in interesting their congregations in conservation subjects. A very hearty response was received, and much attention was directed to Canada's natural resources by this means. Appreciative letters have been received from many of the clergy acknowledging the assistance in their work of the Commission's publications.

In forwarding the names of school principals many enthusiastic letters were received from the educational authorities of the various

provinces, and requests were made for many more copies of *Conservation* than it was possible to supply.

The editor attended the annual meeting of the Canadian Press Association in Toronto, in September, through the courtesy of that association. He was there able to meet personally many Canadian editors and to discuss conservation subjects and the interests of the press in the activities and objects of the Commission.

The following reports were issued during the year: *Sixth Annual Report, Commission of Conservation*; *Altitudes in Canada*, by James White; *Forest Protection in Canada*; *Water-Works and Sewerage Systems*, by Leo G. Denis; *The National Domain in Canada and its Proper Conservation*, by Dr. F. D. Adams; *Discovery of Phosphate of Lime in the Rocky Mountains*, by Dr. F. D. Adams and W. J. Dick; *Report of the Preliminary Conference to Form a Civic Improvement League*, and *Revised Draft of Town Planning Act*.

A report on *Water-Powers of Manitoba, Saskatchewan and Alberta*, *Proceedings of the Meeting of the Committee on Fisheries, Game and Fur-Bearing Animals*, and *Dictionary of Altitudes* are now in press, while the following reports are in course of preparation: *Power Survey of Canada*, by W. J. Dick; *Water-Powers of British Columbia*, by A. V. White; *Forest Resources of British Columbia*, and *Forest Resources of Saskatchewan*.

The Commission is indebted and its thanks are extended to the press of Canada for the large amount of space given to Conservation subjects, and also for extended reports of the meetings of the Commission and its committees at Ottawa, and of meetings and conferences throughout Canada under the auspices of the Town Planning Branch.

MR. J. F. MACKAY: I would very much like to have had a little time devoted to the consideration of the publicity campaign of the Commission were it not that the final session of our annual meeting is drawing to its close. From year to year I have registered my own opinion that the Commission is not availing itself to a sufficient extent of the opportunities of reaching the public which are afforded it. The Commission of Conservation has justified its existence a thousand times over by the magnificent work accomplished in the various departments to which it has been devoting its activities. Those of us who attend these annual meetings know that. Time and again we have been delighted and thrilled by the results of the work accomplished by the officials of the Commission, yet, in my view, those results do not reach the minds and the hearts

of the Canadian people to the extent that they should. We expend a good deal of money, and, when we are advising the people of Canada to husband their resources, we must be careful to conserve our own. At the same time it does not strike me as a wise thing to spend money to secure the mine of information contained in our publications—publications that are certainly well gotten up in all respects—and then have those publications distributed where they are not likely to be read. At our next annual meeting I hope some time will be allotted to the discussion of this very important matter. I think we are open to rather severe criticism for having failed to secure a larger hold upon the Canadian people than we have, with the splendid work which has been accomplished. I am criticising the Department with which I myself am connected, and therefore feel more at liberty to express my opinion. I am not blaming the officials of the Commission, who have performed magnificent work. The suggestion I throw out is that if possible our activities in the matter of publication should be directed along broader channels. The wonderfully interesting and valuable information compiled through the medium of the Commission of Conservation should reach thousands of our people, and yet I venture to say that instead of thousands, hundreds only peruse that information.

I was struck with one statement in the report which Mr. Nunnick presented to us,* that out of the total number of farmers to whom the questions were directed, 77 per cent replied that they were reading daily newspapers. That is a very remarkable development in this country. I venture to say that if the same question had been asked these farmers five years ago, the answers would have disclosed that not 15 per cent of these same farmers were reading daily journals. The fact that these farmers are reading daily papers makes it almost certain that they are not making use of other publications, because they have not the time, even if they had the inclination, to peruse bulletins and reports issued in some stereotyped form. The daily newspaper is undoubtedly usurping a great deal of the time that was formerly spent by the farmer in reading magazines or other publications. It is not possible to discuss the matter, but I do trust that some reform will be made whereby the reading matter which the Commission is sending out, may reach the public to a very much larger extent than it does at present. We all know the excellent results that followed the patriotism and production campaign, inaugurated last fall. The platform and the press were both largely used in appealing to the public. As to the extent of the success of appeals through the press as compared with appeals from the plat-

* Agricultural Survey, page (152).

form, I cannot say. We all know that the press reaches thousands of readers, whereas the number that can be reached from the platform is comparatively limited. The printed word reaches thousands of readers, whereas the spoken word may not reach more than its hundreds.

THE CHAIRMAN (Dr. Robertson): We have now reached the end of our official programme. I regret we were unable to afford more time to some of these subjects, but it was not practicable, owing to the limited time at our disposal and the number of items on the programme. I might take this opportunity of saying, in a word, that it would seem to many of us expedient that either we should have fewer items on the programme for our next annual meeting, or longer time to deal with them. It does not seem desirable to have so many subjects presented, and no time, or very little time, allowed to the members of the Commission to consider their bearing and express their opinions for the guidance of the several committees. We still have to receive the reports of the committees, and, as this is the last session for the present meeting, it will be necessary to dispose of them with reasonable despatch.

Before we take the committee reports, however, I want to say that the Commission appreciates very warmly the kindly services of those who have given such good addresses or read papers at this annual meeting. While expressing appreciation of the courtesy on the part of those who have come to us, I can assure them that, although the audience here may be comparatively small, the number reached through the medium of our printed reports is very large, and in that way the influence exerted by their contributions will be widespread, and will be felt throughout the whole of Canada.

Reports of Committees—Resolutions

THE reports of the various committees, together with their recommendations, were then presented, followed by the resolutions prepared by the Committee on Resolutions appointed at the initial session.

Committee on Lands

DR. GEORGE BRYCE: The Committee on Lands begs to report:

That the supervision of the Illustration Farms was undertaken by the Division of Illustration Stations of the Dominion Experimental Farms during the year 1915.

That the arrangement made with the illustration farmers for the carrying on of illustration work for a period covering three successive harvests has been thus completed in the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward island.

That the reports from the illustration farmers show that substantial benefits, to these farmers and their neighbourhoods, have resulted from the various lines of work inaugurated and carried on.

That the cordial thanks of the Committee on Lands be and are hereby tendered to Mr. John Fixter for his efficient and faithful services in connection therewith.

That the cordial thanks of the committee be expressed to each of the illustration farmers, and that they be invited and encouraged to form themselves into an Illustration Farmers Association, in order to continue, extend and increase the benefits which result from such illustration work.

That, in pursuance of the plan approved at the last annual meeting of the Commission, a preliminary survey was made by means of a detailed inquiry by a representative of the committee visiting 100 farmers in each of four counties in Ontario;

That the preliminary survey and inquiry indicate that cordial co-operation in carrying out the proposed plan for an Illustration County can be secured from the local, provincial and Dominion authorities concerned; and

That the committee recommends that the further steps be taken to inaugurate and carry on such work as may be necessary for an Illustration County as outlined in the previous report of this committee.

That the committee recommends very earnestly, to individual farmers and to all local, provincial and Dominion authorities con-

cerned with the matter, that no effort be spared to reduce, as quickly and as far as practicable, the prevalence of weeds, and to bring about generally, on the farms, cultivated fields and seeds which shall be reasonably clean;

Further, that steps should be taken to introduce to the people, and the scholars in our schools, methods of carrying on the work of weed extermination; and that the publications of the Commission keep this matter prominently before its readers.

On motion of Dr. Bryce, seconded by Dr. C. C. Jones, the report was adopted.

Committee on Minerals

DR. F. D. ADAMS: The Committee on Minerals recommends:

That the Commission of Conservation commend the action of the Government of Alberta in requiring that all mine plans shall show the position of gas or oil wells and their relation to the workings of any mine which approaches within a distance of 2,000 feet of such wells; and, further, that, as a number of bore-holes have been drilled through coal measures in the search for oil and gas in the province of Saskatchewan, this province be asked to adopt regulations similar to those now in force in Alberta.

On motion of Dr. Adams, seconded by Dr. Howard Murray, the recommendations were adopted.

Committee on Forests

MR. SNOWBALL: The Committee on Forests submits the following recommendations:

1. The matter of regulating settlers' slash-burning operations should be taken up with the governments of Ontario, Quebec and New Brunswick, along the lines discussed in the report of the committee.

2. As in previous years, the extension of the Dominion forest reserve area should be urged upon the government. It is noted that no new forest reserves have been established since June, 1914, although the necessary classifications have been completed, showing that there are large additional areas of non-agricultural lands suitable chiefly for forest purposes.

3. The bringing of the field service of the Dominion Forestry Branch under civil service regulations is absolutely essential to even an approach toward efficient and economical fire protection on

Dominion lands. If it should appear that the new Civil Service bill is not to be considered at the present session of Parliament, a strong effort should be made to have the necessary action as to the Forestry Branch taken by order in council. It is understood that this can be done as readily under existing legislation as under the proposed new bill.

4. The government of New Brunswick should be congratulated on the proposed early beginning of the forest survey and classification of Crown lands. The Commission of Conservation should co-operate in the technical aspects of this work to as great an extent as financial considerations will permit.

5. The Committee on Forests believes that the inventory of forest resources of the Dominion, so well begun in British Columbia, Saskatchewan and Nova Scotia, should be continued, without interruption, in other provinces, even should it become necessary, in order to conserve funds, to slightly delay the publication of the British Columbia and Saskatchewan reports.

6. The adoption of resolutions by the Commission has proved ineffective or only partially effective, in past years, in connection with a number of matters of great importance to the conservation of our forest resources. The committee feels that, instead of recommending the adoption of further resolutions along these same lines, it will be preferable to devote stronger personal efforts toward accomplishing the desired results, on the basis of representations previously made. Some of the matters in this category are as follows: Reorganization of the respective fire-protective services, with a view to securing larger personnel and a closer degree of supervision over the work of the field staffs; slash disposal on logging operations and along railway lines; the encouragement of further organizations for the co-operative handling of fire protection work on timber lands; more adequate fire protection along Government railways; better fire protection on the Trent watershed, including, if possible, the establishment of a Dominion forest reserve under some arrangement between the Dominion Government and the Government of Ontario. It is to be hoped that the matter of fire protection on this watershed will be considered by Parliament, during the present session, in connection with the proposed discussion of means for the utilization of surplus water-power from the Trent canal, for the generation of electricity. The action suggested would tend toward the more complete conservation of both power and navigation.

On motion of Mr. W. B. Snowball, seconded by Dr. Frank D. Adams, the report was adopted.

Committee on Press and Co-operating Organizations

MR. J. W. MACKAY: The Committee of Press and Co-operating Organizations recommends as follows:

That, owing to the extension of the work of the Commission to cover the subject of fire prevention, *Conservation*, our monthly publication, be forwarded to the chiefs of fire departments in Canada, as well as others working in the interests of fire prevention.

That, the recommendation made at the last annual meeting, *re* the supplying of ready-made lectures to those who would use them, be renewed.

That the question of the adaptability of the moving picture film to publicity of conservation subjects be investigated, and, if found advisable, and the cost within the means of the Commission, that this medium of publicity be adopted.

The Committee would also advise that there be no delay in the publication of reports. That, as the work of the Commission is educational, it is in the interests of the work to give all available information to the public as soon as possible.

On motion of Mr. J. F. MacKay, seconded by Dr. Bryce, the recommendations were adopted.

Committee on Public Health

DR. JONES: I have been asked to say a word or two on behalf of the Committee on Public Health. I think I am the only representative of the committee here to-day. What I wish to say relates particularly to our lack of activity along public health lines during the past year. That is accounted for almost altogether by the absence of our Medical Adviser, Dr. Hodgetts. We are very glad to know that Dr. Hodgetts is doing such good work in another field, and I feel sure I am expressing the sentiments of every member of the Commission when I say that we miss his activities very greatly in connection with the work of the whole Commission, and especially in connection with that of the Committee on Public Health. We are very glad, indeed, to learn that he is recovering so rapidly from his illness, and we trust he will soon be able to resume his normal activities in the new work that he has taken up.

The only other remark I wish to make is a word of appreciation of the excellent work done by Mr. Thomas Adams, our Town Planning Adviser, which comes more closely within the purview of the Public Health Committee than of any other committee of the Commission. We feel that Mr. Adams is doing excellent work, and I think I may say, on behalf of the committee, that we appreciate

that work and are very willing to give him all the encouragement we possibly can in the efforts he is making towards the development of proper town planning and housing conditions in Canada.

THE CHAIRMAN (Dr. Robertson): I am sure we all re-echo Dr. Jones' hope that Dr. Hodgetts, who is doing such excellent work, as Red Cross Commissioner in England, will soon be back in his usual health. Every member of the Commission will also endorse what he says with respect to our appreciation of the good work of Mr. Adams, and our hope is that he will be able to realize some of his own wishes and aspirations. If he does that he will do as much as we could expect any man to accomplish in this country.

Committee on Waters and Water-Powers

HON. O. T. DANIELS: I beg leave to submit the following report:

This last report, to which I will here briefly refer, is published in the Sixth Annual report.

I desire again to express the deep regret which is entertained regarding the continued enforced absence of Dr. Béland and the hope that he may soon be with us again. His work in connection with the Committee on Waters and Water-powers is greatly missed. Our committee has been so reduced that it is recommended that Dr. Fernow and Dr. Adams be added to this committee.

Last year the Committee on Waters and Water-powers reported that throughout the year the work of the officers of the Commission connected with the water investigations had been especially heavy, owing to the fact that a number of special problems had arisen which demanded attention. A corresponding comment applies with equal force to the experience of the present year.

While matters calling for special consideration in connection with the waters of Canada are likely to arise at any time, yet the Committee has realized that it is desirable to have some main lines of work, so to speak, which the staff connected with waters could pursue whenever opportunity permitted. The committee desires to repeat its recommendations of last year.

It is quite appreciated that the amount of work involved in the carrying out of these recommendations is sufficient to occupy the present staff for several years.

The Committee on Waters and Water-powers last year, in response to a request from the province of Nova Scotia, suggested that co-operative effort could no doubt be arranged between the departments of the Dominion and Provincial governments to carry

on water-power investigations in the province. We are glad to note that this suggestion has produced practical results, and we are informed that the water-power investigations begun in Nova Scotia during the past year by the Dominion Water Power Branch co-operating with the Nova Scotia Water-Power Commission have progressed very satisfactorily. The committee trusts that the work thus commenced will be continued.

The committee has been informed that, on account of the European situation and the necessary curtailment of expenditures, some departments of both the Federal and Provincial Governments administering waters are having to consider the possibility of reducing the number of stations at which hydrographic data are being secured. In this connection it is urged that the greatest caution be exercised in selecting any stations which require to be discontinued, because the relatively small saving would mean a much greater sacrifice to the country at large, owing to the continuity of the record being interfered with. Certainly no important stations, especially any connected with boundary waters, should be discontinued without the most mature consideration.

If, as we all hope, there is to be a period of industrial activity following the close of the present war, it is all the more necessary that the gathering of data essential to such development be not materially interfered with.

On motion of Hon. O. T. Daniels, seconded by Dr. Howard Murray, the report was adopted.

Committee on Fisheries, Game and Fur-Bearing Animals

DR. C. C. JONES.: The Committee on Fisheries, Game and Fur-Bearing Animals recommends:

(1) That the Minister of Agriculture be requested to grant permission to Dr. Gordon Hewitt to prepare a paper on "Conservation of Wild Life in Canada" for the Commission of Conservation.

(2) That the following three resolutions, passed at the committee meeting held in November, be ratified by the Commission:

(a) Resolved, that the committee commends very earnestly to the federal and provincial authorities who are charged with the conservation and improvement of Canadian fisheries, the question of providing opportunities for vocational education suitable for those engaged in the industry; and

Resolved, further, that the committee most respectfully recommends the institution, as soon as practicable, of simple

demonstration stations, the employment of competent traveling instructors and the distribution of well-illustrated bulletins dealing with the practical problems arising from fishery occupations.

(b) Resolved, that the committee learns with satisfaction of the action of the Dominion Fisheries Branch in increasing the number of whitefish fry planted in the Great lakes, and hopes that the number may be increased to that suggested as sufficient by the best authorities, namely, 20,000 per square mile of whitefish area.

(c) Whereas, the committee heartily approves of the efforts now being made for the preservation of North American migratory birds, some of which are seriously threatened with extinction, and learns with satisfaction the attitude of the provincial governments in this connection. Now, therefore, be it

Resolved, that the good offices of the Dominion government be solicited to negotiate a convention for a treaty between Great Britain and the United States for the purpose of securing more effective protection for the birds which pass from one country to the other.

On motion of Dr. C. C. Jones, seconded by Dr. Howard Murray, the recommendations and accompanying resolutions were adopted.

Committee on Resolutions

MR. W. B. SNOWBALL: The Committee on Resolutions wishes to present its report, and would recommend the adoption of the following resolutions:

ADDITIONS TO COMMITTEES

(1) That Dr. Fernow and Dr. Adams be added to the Committee on Waters and Water-powers.

(2) That Mgr. Choquette and Dr. Rutherford be added to the Committee on Public Health.

(3) That Hon. A. E. Arsenault be added to the Committee on Fisheries, Game and Fur-Bearing Animals.

(4) That Mr. J. F. MacKay be added to the Committee on Minerals.

(5) That Dr. Frank Adams be added to the Committee on Lands.

(6) That Mr. McCool be acting chairman of the Committee on Waters and Water-Powers in the absence of Dr. Béland.—Adopted.

AMENDMENT OF NORTHWEST GAME ACT

RESOLUTION, *re* amendment of the Northwest Game Act of 1906, to secure greater protection to the mammals of the Northwest Territories.

That, in view of the fact that certain of the game animals inhabiting the Northwest Territories are in urgent need of more rigorous protection, owing to the following facts: That these animals, particularly the barren ground caribou, the musk-ox and the white fox, are rapidly decreasing in numbers, that they constitute the chief natural resources of our northern territories, that they are economically important to the country as sources of food and clothing to the inhabitants, particularly the Eskimos, and as sources of future revenue, and that their extinction cannot be prevented should they reach a certain stage of extermination; and, in view of the fact that, in order to secure adequate and efficient administration of the Act, it is necessary that it should be administered by an executive officer of the Department of the Interior, the Government be most earnestly requested to amend without delay the Northwest Game Act of 1906, to meet the changed conditions brought about by the continued and rapid extermination of the animals referred to in particular, and that the Act be so amended as to provide for the following:

1. The administration of the Northwest Game Act by the Commissioner of Dominion Parks, as his branch is already charged with the protection of game on Dominion lands, and he can give the matter more of the close attention and supervision that it requires in order to secure proper and efficient administration.

2. The continued rigorous protection of the wild or "wood" bison in the Northwest Territories.

3. Increased protection to the barren ground caribou, which is rapidly becoming diminished in numbers in the north for the want of adequate protection, by providing that female and yearling caribou shall not be killed, and that this prohibition shall extend to Eskimos and Indians; and, further, by providing for the prohibition of the export of caribou skins, except under license, which should not permit the export by *bona fide* hunters or other duly authorized persons of more than two skins and two heads under permit of the sub-collector of customs at Herschel island, who should be *ex-officio* a game warden under the Act.

4. Increased protection to the musk-ox, by providing that they shall only be killed under license, except in the case of natives or *bona fide* explorers, and that such licenses shall not permit the killing and taking out of more than two heads

and skins. Further, that natives or *bona fide* explorers shall only be allowed to kill musk-ox for food and not in order to secure the skins.

5. The prohibition of the killing of musk-ox on Victoria, Banks and Melville islands, thereby constituting these islands as permanent reserves for musk-ox, and as centres for its natural distribution to neighbouring territory.

6. The inclusion of a close season in the Act for white fox from April 1 to November 15, as this animal is rapidly decreasing in numbers for want of such protection.

7. The appointment of competent game guardians by the Minister of the Interior, to assist where necessary the members of the Northwest Mounted Police in enforcing the provisions of the Act.

8. Adequate provisions to prevent the indiscriminate slaughter of game animals, regardless of age, sex or season, by the Indians of the Northwest Territories.

And, further, that the attention of the Department of the Interior be called to the great importance of the destruction of wolves and other predatory species in the North-west Territories as a means of checking the reduction in numbers of the caribou and other game animals, and that the Eskimos and Indians be encouraged to destroy the wolves and to export their skins for commercial purposes.—Adopted.

TOWN PLANNING

That the Commission approves of the steps being taken to urge Provincial Governments to pass Town Planning Acts, as drafted by the officers of the Commission, especially in view of the necessity for securing greater economy in connection with the development of land, greater convenience in the lay-out of streets, and preservation of features of natural interest.—Adopted.

AGRICULTURAL DEVELOPMENT

Whereas, the present methods of planning, dividing and settling land in Canada for agricultural purposes has not met with the measure of success which might be expected, having regard to the great natural advantages we possess in the Dominion. The Commission therefore recommends the Dominion and Provincial Governments to make investigations into the problem, and to consider the need for a more scientific method of laying out the land so as to encourage greater co-operation among farmers and secure better facilities for transportation, education and social intercourse.

In view of the conditions likely to arise after the war, and in connection with the return of soldiers from the front, the Commission desires to specially direct attention to the need for this problem being dealt with in the immediate future.—Adopted.

DEPARTMENTS OF MUNICIPAL AFFAIRS

Whereas, at the fifth annual meeting of the Commission of Conservation it was resolved to recommend each Provincial Government to create a department of municipal affairs, whereby the best expert advice would be placed at the disposal of municipalities and proper control would be secured over municipal finance; therefore, as a result of subsequent study and investigation by the officers of the Commission of the problems of municipal government, and consideration of the need for uniformity in sanitary and town planning administration, we again urge the great desirability of early steps being taken to have such a department created in each province.—Adopted.

FIRE PREVENTION ENGINEER

That it appears desirable that arrangements should be made as soon as practicable, for the employment of a competent engineer in the Town Planning Branch of the Commission, to collect information and study the question of fire losses, wastes and prevention in respect to buildings, etc., and their contents, to advise on the subject, to promote the formation of voluntary local fire prevention commissions and to generally advance the education of the public in this matter.—Adopted.

STATISTICS OF FIRE LOSSES

That each Provincial Government be requested to take steps to secure complete reports on all losses from fires occurring within its boundaries, and the extent, if any, to which the property was insured.—Adopted.

SYMPATHY WITH DR. BÉLAND

That the members of the Commission express their sincere sympathy with their colleague, Dr. Béland, record their sense of personal loss through his absence from their meetings and hope he may return to continue his work with them unimpaired in health and power.—Adopted.

MR. SNOWBALL: I hope this communication will be able to reach Dr. Béland, so that he will know that we, the members of

the Commission assembled here, have missed him from our meeting, and that we will have the pleasure of seeing him back with us at an early date.

SYMPATHY WITH SIR CLIFFORD SIFTON

DR. BRYCE: On behalf of the members of the Commission I wish to place on record our deep sympathy with our Chairman, Sir Clifford Sifton, in his absence. Sir Clifford has been called to England owing to the dangerously wounding of one of his sons and the serious illness of another. Two other sons are also at the front. We earnestly trust that these gallant young men may soon be sufficiently recovered as to permit the return of Sir Clifford to his home and to his accustomed place among us.—Adopted.

MR. JAMES WHITE: I wish to say a few words with respect to the financial condition of the Commission. During the current year we have had the sum of \$93,000 to carry on the work of the Commission. As a result of the appeal from the Finance Minister, Sir Thomas White, Sir Clifford reduced our estimates for the coming year, 1916-17, to \$80,000. That is a reduction of the whole vote by \$13,000, which is practically a 25 per cent reduction of our controllable expenditure. That means, of course, that we will have to exercise the strictest economy. Let me mention one instance which will be affected by the need for economy. For instance, Mr. Wentworth has recommended the appointment of an expert respecting fire prevention. No one will deny the great desirability of such an appointment, but it cannot be done with our present financial resources. We now have three members of our staff who have volunteered for war service: Dr. Hodgetts, who has been referred to already; Mr. Donnell, who is now with the artillery at Kingston; and Capt. Ferguson, who is with the Engineers. Under a recent order in council, no member of the staff who goes on active service and whose work requires that a substitute be appointed in his place, can receive any payment from the government other than his military pay. To avoid these members of our staff losing their salaries we have divided up the work amongst ourselves.

With regard to the work of the Printing Committee, I am sure that if Mr. MacKay would put his ideas, or his observations, into shape and let us have a memorandum, we will be only too delighted to carry them out. I have been 32 years in the government service, and I confess that I have yet a great deal to learn with regard to reaching the public with printed material. In undertaking this, one is necessarily confronted with great difficulty. Is the distribu-

tion of the printed material to be indiscriminate or discriminate? If you discriminate you must necessarily refuse applications from a great number of people; you must, in many cases, depend upon the handwriting to determine whether the applicants are literate, whether they are children, whether they are likely to make good use of the material which they have applied for. That is one of the greatest difficulties we encounter in distributing our publications. Practically all the applications that come in receive personal examination to decide whether the applicant is a *bona fide* applicant and one who should receive the report for which he applies. We are greatly troubled with "blanket" applications, such, for instance, as came in this morning, where the applicant asked for "any printed material that you issue." That demonstrated that this applicant had absolutely no idea of what we are doing, and probably would not make any use of these reports. Our reports are expensive. As Mr. MacKay has said, they are printed on good paper, with good type and good illustrations. If we acceded to all the applications received, it would be impossible for us to carry on any field work; all our money would be expended on our reports. If anyone can make any practical suggestion regarding the method of distributing our literature—that is, to increase our distribution and reach the 'man in the street,' the man who pays our bills—we will be only too glad to act upon it.

MR. SNOWBALL: So far as the reports dealing with farm lands are concerned, would it not be possible to have those published, or portions of them, in the agricultural papers and in the larger dailies in the Province, by paying for the publication? It costs so much to print these reports that it occurs to me perhaps many more people would read them if they were published in some of the agricultural papers and dailies. In that way we might be relieved of the expenditure which the printing and distribution of these reports involves. The idea occurred to me when Mr. MacKay was speaking on Mr. Nunnick's report, a report that I think would do a lot of good if it reached the farmer's hands, because it is one which he would certainly read if he saw it. As you doubtless know, farmers and others who live in the country, when they undertake to read a paper, do so very thoroughly. They start at the front of the paper and read it right through, and attach to it almost the credence that they would their Bible.

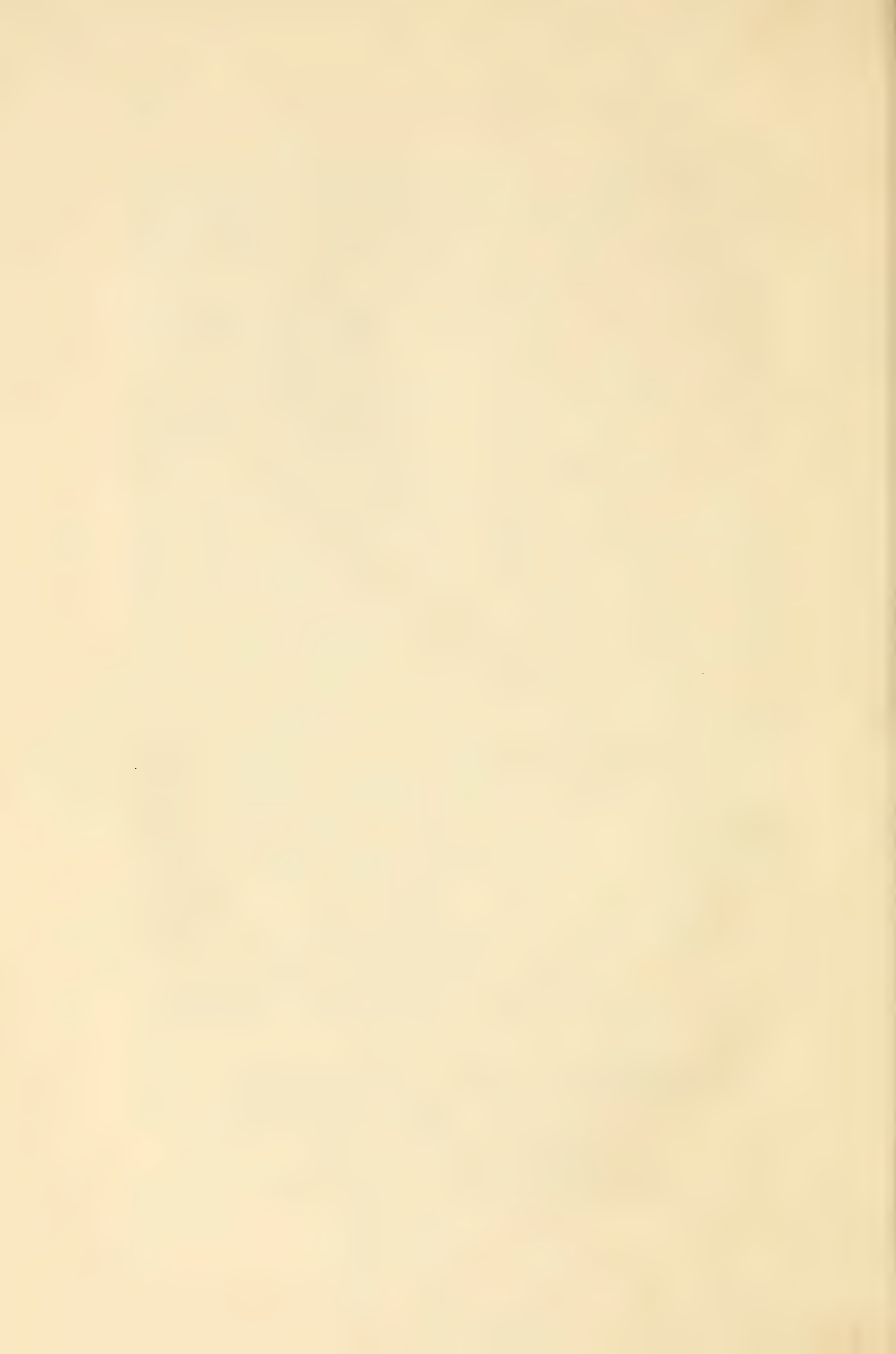
MR. JAMES WHITE: Mr. Snowball's suggestion is an excellent one in form and substance, but it would create endless trouble by establishing a precedent. We have had scores of applications

from various publications for just such assistance as has been mentioned. Whether you call it "advertising" or "publication material," if we once opened the door to such a system we could not satisfy everybody, there would be endless complaints from publications that were not favoured, and we would receive much criticism for such expenditure of public funds.

THE CHAIRMAN (Dr. Robertson): I would like to mention in that connection that a great deal of the matter relating to agriculture which appears in our report, is published in agricultural papers. I once tried this experiment: I had reports nearly as big as that (holding up volume), and I had two-thirds of it by actual count published in not less than eighty of the big papers of Canada, by spreading the distribution over about 8 months on a regular timetable. I counted the clippings and had the thing done. I am sure, in regard to these separate publications, like the agricultural survey and the report of the illustration farm work, that two-thirds of both of these will appear in the agricultural papers, and in the weekly newspapers during the next three months. The papers are glad to get that material when they get it in good form. At the same time, there is very much work done by the Commission which it is not yet seemingly practicable to get to the ordinary man's understanding, and which would be for his good and our growing influence if we could get him to understand. I do not know how that could be accomplished, except, perhaps, by a wider use and amplification of "Conservation," which is quite widely quoted from in the daily newspapers, sometimes without any credit being given to the source. I myself in my daily newspaper, often read bits from "Conservation" clipped and inserted without any credit at all. In that way we are making headway.

DR. MURRAY: It is not very long since I was in a second-hand book collector's and I saw a long list of the reports of the Conservation Commission marked down at the price of 50 cents each. It seems to me that fact might possibly throw a little light upon some of these applications which are coming in to the Commission for publications.

THE CHAIRMAN (Dr. Robertson): If there is no other business, I will again thank those who have so generously given us their assistance, and will declare this session of the Annual Meeting closed, and the meeting adjourned.



Appendix I

International Joint Commission

IN RE THE APPLICATIONS OF THE ST. CROIX WATER POWER COMPANY AND THE SPRAGUE'S FALLS MANUFACTURING COMPANY, LIMITED, FOR APPROVAL OF A DAM AND POWER CANAL AND THE OBSTRUCTION, DIVERSION AND USE OF THE WATERS OF THE ST. CROIX RIVER AT GRAND FALLS IN THE STATE OF MAINE AND THE PROVINCE OF NEW BRUNSWICK

Order of Approval

The above applications having come on for hearing at the City of Calais in the State of Maine on the 15th day of June, 1915, and having been continued to the 5th, 6th and 7th days of October, 1915, at the City of Ottawa, Canada, on which last day the hearing was concluded, the said applications relating to the same subject matter being consolidated and heard as one application, and due notice of the filing of said applications and of the time and place of the said hearings having been given to all parties interested in both countries, the Commission having heard the evidence adduced by all parties interested, including the statements of the engineer representatives of the United States and the Dominion of Canada in respect thereto, and also having heard counsel on behalf of all parties interested, finds as follows:

(a) The St. Croix Water Power Company is incorporated by special Act of the Legislature of the State of Maine (Chapter 203, Acts of 1899), and the Sprague's Falls Manufacturing Company, Limited, is incorporated by statute of the Dominion of Canada (2 Edward VII, Chapter 103), both companies being incorporated for substantially the same purpose.

(b) Acting upon the supposition that no other authority was necessary than that given them by the aforesaid acts of incorporation, the said companies, acting in unison, proceeded to construct, and did construct, at Grand Falls a dam across the St. Croix river and a power canal on the United States side of the St. Croix river to convey the waters of the river to a power house situate a short distance below the dam, which dam is for the purpose and has the effect of obstructing and holding back the waters of the said river.

(c) The dam is of the Ambursen type. It is 820 feet long between the present Canadian shore line and the international

boundary and 280 feet long between the present United States shore line and the international boundary, with an abutment on the Canadian shore 40 feet long and an abutment on the United States shore 100 feet long.

(d) The crest of the dam for a length of 80 feet on the United States side of the international boundary and for a length of 218 feet on the Canadian side is at an elevation of 193.70 above mean sea level; for a length of 540 feet on the Canadian side it is at an elevation of 198.10 above mean sea level, and for a further length of 22 feet on the United States side and 54 feet on the Canadian side it is at an elevation of 205.10 above mean sea level. Flash boards at an elevation of 201.20 above mean sea level cap the whole of the two lower sections of the crest. In the dam on the Canadian side are two submerged sluices 6 feet by 8 feet with sills at an elevation of 167.60. These are controlled by gates operated by electric power. On the United States side are nine Tainter regulating sluice gates 14 feet wide with sills at an elevation of 196.10 and a log sluice at the shore end. The dam as now constructed contains no fishway.

(e) The power canal leaves the west branch of the St. Croix river a short distance above the dam and near the junction of the east and west branches of the river. It is 2,700 feet long, 50 feet wide on the bottom at elevation 185.10, and 115 feet wide at elevation 202.10. This canal joins the St. Croix river a short distance below the dam and at the junction is a power house having therein at present two (with space for a third) 54-inch Holyoke wheels with capacity of 4,000 horse power each, under a 49-foot head.

(f) Provision for a fishway has been made in the dam at the lower end of the power canal. This fishway has been designed to permit the passage of fish up and down stream through the power canal, but the fishway is not yet completed.

The log sluiceway above referred to in the dam across the river is ample for the purpose of driving logs or lumber down stream.

(g) The two companies have constructed and are now using the said dam and power canal at Grand Falls for the purpose of generating power supplied to the pulp and paper mill now owned by the St. Croix Paper Company at Woodland, in the State of Maine, a few miles farther down said stream.

(h) The St. Croix river is a boundary water within the meaning of the treaty of January 11, 1909, between Great Britain and the United States of America. The effect of the said dam and power canal as constructed and maintained is to divert the waters of the said St. Croix river on the Canadian side and cause them to flow through the State of Maine, thereby altering the levels on the United States side of the international boundary; also to divert the waters of the said river on the United States side of the said boundary, thereby altering the levels of the waters of the said river on the Canadian side of the said boundary.

(i) The applicants are owners of the riparian lands on both sides of the said river which are affected by the change of the levels of the said river.

The companies having applied to the Commission for its approval of the said dam and its maintenance and operation and of the obstruction, diversion and use of said waters, and it appearing to the Commission that such approval should be granted.

Therefore, it is hereby ordered that the maintenance and operation of the dam aforesaid and the diversion and use of the waters of said river for the purpose in paragraph (g) hereinbefore contained, be, and the same are hereby, approved upon and subject to the following conditions:

(1) That the applicants have obtained, or shall hereafter obtain, from the United States and the Dominion of Canada within their respective jurisdictions authority for the maintenance of the said dam as constructed and the obstruction, diversion and use of the waters of the St. Croix river at Grand Falls in the State of Maine and the Province of New Brunswick for the said purpose.

(2) In case the waters so diverted cease to be used for the purpose mentioned in paragraph (g), this order of approval shall thereupon cease to be operative unless the Commission, upon the application of the United States or the Dominion of Canada, continue it on such terms and conditions as the Commission may prescribe.

(3) All the sluices, log sluices, flash boards, bye passes, power plant and storage reservoirs shall be so operated as to prevent the level of the water at the dam rising above 202.00 (mean sea level datum). For this purpose the operation of all the said works, canals, head-gates, sluices and log sluices of all kinds, dams and bye passes shall be under the direct control of the board hereinafter designated.

(4) All the sluices, log sluices, power plants and storage dams shall be so operated as to pass continuously the minimum discharge of the river plus such other quantity as the board of control shall determine is available.

(5) To enable the board to determine the quantity of water that should be passed down stream, two gauges for registering the precipitation shall be established by the two Governments at suitable stations in the valley of the said river.

(6) An officer to be appointed by the Governor General in Council of Canada and one to be appointed by the Secretary of War of the United States shall form a board whose duty it shall be to formulate rules under which the sluice gates, log sluices, power works and storage dams are to be operated to prevent as nearly as possible a higher level than 202.00 (mean sea level datum) and to secure to the users of water below Grand Falls, the flow of water to which they are entitled. It shall be the further duty of this board to see that any rules or regulations now or hereafter made by proper authority are duly obeyed.

(7) The power company at Grand Falls shall keep continuous records, satisfactory to the board, which will show the quantity of water used by it; and shall furnish to the board, when required, full information from such records.

(8) The board will determine at all times the amount of water to be passed to the users of water below and the owners of the said dam and power canal for the time being shall supply the necessary labour for the operation of the various gates.

(9) The cost of maintaining all parts of the dam and all sluices and log sluices shall be borne by the owners thereof and this work of maintenance shall be done in a manner satisfactory to both Governments.

(10) In the event of a disagreement between the members of said board, in respect to anything required of said board herein or in respect to the duties or powers of said board or as to the exercise of such duties or powers, the question at issue shall, upon the application of either Government, be referred to this Commission for its decision.

Dated at New York City, N.Y., November 9, 1915.

C. A. MAGRATH
O. GARDNER
H. A. POWELL
JAMES A. TAWNEY
P. B. MIGNAULT
R. B. GLENN

Appendix II

Draft Town Planning Act

AN ACT WITH RESPECT TO PLANNING AND REGULATING THE USE AND DEVELOPMENT OF LAND FOR BUILDING PURPOSES

His Majesty, by and with the consent of the Legislative Assembly of _____, enacts as follows:

PART I—TITLE, INTERPRETATION, AND APPOINTMENTS

SHORT TITLE

1. This Act may be cited as The Town Planning Act.

INTERPRETATION

2. In this Act, and in any rule or regulation made thereunder, unless the context otherwise requires:—

2. "Department" means the Department of Municipal Affairs.
3. "Minister" means the Minister of Municipal Affairs.
4. "Comptroller" means a town planning comptroller appointed by the Minister.
5. "Local Authority" means the governing body of a city, town or rural municipality.
6. "Local Board" means a town planning board appointed by a local authority, or such board or other authority as may be designated or appointed by the department as the authority to be responsible for carrying out a town planning scheme.
7. "Surveyor" means a town planning surveyor, appointed by the local board.
8. "Land or Lands" includes lands, tenements and hereditaments and any interest therein, and also houses, buildings and other works and structures.
9. "Main thoroughfare" means a principal highway which (1) connects or is likely to connect two populous districts or parts of one district or municipality, or which forms the principal means of approach to a city or town, or (2) any main arterial thoroughfare which in the opinion of the Board of Highway Commissioners of the province is necessary or desirable for securing adequate means of communication by road between different parts of the province.

APPOINTMENTS

3. The Minister shall appoint a comptroller, who shall be a competent engineer or architect, and shall be the executive officer responsible to the department.

4. Every local authority shall appoint a Local Board, consisting of the mayor or reeve, and two other members of the council (ex-officio), and not less than two rate-payers to be appointed by the local authority for three years.

2. Where a local authority fails to appoint a Local Board within one year after the passing of this Act the Department may make the appointment, and a Board so appointed shall have the same powers as if appointed by the local authority.

3. Every Local Board shall be a body corporate and shall have power to acquire, receive and hold, sell, lease and dispose of lands and any interest therein.

4. The Local Board shall appoint the engineering officer of the local authority, or other qualified person as its town planning surveyor.

5. The surveyor shall be the executive officer of the Board and, with the Board, shall be responsible for carrying out the provisions of this Act and the regulations and by-laws issued thereunder.

6. The surveyor shall not be removed from office and, if he is paid a salary or other remuneration, his salary or other remuneration shall not be reduced except, in either case, with the unanimous approval of the Local Board.

PART II—NEW STREETS AND SUB-DIVISIONS

POWERS AND DUTIES OF LOCAL BOARD TO APPROVE ALL NEW DEVELOPMENT

5. Notwithstanding any statute, by-law, rule or regulation in operation in any area, it shall not be lawful to reserve, lay out, grant or convey any street, road or public right-of-way, nor to sub-divide or sell as lots, any property, tract of land or area, unless in accordance with plans, sections and particulars submitted to and approved by the Local Board, or by the local authority pending the appointment of the Local Board.

2. The Local Board shall make regulations with regard to the procedure to be adopted with respect to applications for approval of such plans, sections and particulars, including applications which have to be submitted for the joint approval of more than one Local Board, and such regulations, when made, shall not come into effect until and unless approved by the Department.

3. Applications made under this section shall be made in writing, and the regulations shall (a) fix the time within which plans, sections and particulars may be approved or rejected; (b) deal with any reasonable requirements of the Local Board as regards the

submission of plans, sections and particulars showing the proposed method of laying out or sub-dividing land adjoining that included in the plan accompanying an application; and (c) indicate what details are required to show the proposed line of frontage of buildings proposed to be erected, and the proposed widths, formation and method of construction of streets, roads and public rights-of-way.

6. When application is made to the Local Board to approve the reservation or laying out of a street, road or public right of way, or a sub-division, the Board may require that any new street needed for the purposes of a main thoroughfare, shall be formed of a width of 100 feet.

2. If the Board require a street to be of a greater width than 100 feet, then, in the absence of the consent of the abutting owners to give the land for the purpose of such greater width, the Board shall purchase from the owners and they shall sell to it the additional land required, and the Board shall also make compensation to such owners for any loss or damage sustained by them by reason of the Board requiring the street to be of such greater width.

3. Pending the preparation and approval of town planning by-laws or a town planning scheme for any area, the Board may, notwithstanding the provisions of any by-laws in force in the municipality as to the width of streets, enter into an agreement with an owner of land to permit any new streets proposed to be laid out on such land and not forming main thoroughfares or continuations of main thoroughfares, to be of a less width than sixty-six feet, where the owner gives up to public use land required for widening a main thoroughfare to a greater width than 100 feet.

4. No street shall be of less width than forty feet, unless approved by the Department, and conforming to the conditions set out in schedule "A" to this Act, as regards variations in the width of streets.

7. A Local Board may, for the purpose of securing the proper laying out or development of any land within its area, or in connection with any application under the preceding section, require that (a) provision shall be made for adjusting and altering the boundaries of any such land, or any land adjacent or near thereto, and for effecting such exchanges of land or cancellation of sub-division as may be necessary or convenient for such purposes, and (b) when such land or any part thereof has been sub-divided and sold as lots but not generally built upon, the Board may, with the approval of the Minister, and subject to the consent of twenty-five per cent of the owners, require the preparation of a new plan for such sub-division, and the alteration of the position, width or direction of any streets, roads or right-of-way shown on the original plan of such sub-division.

2. The provision to be so made and the terms and conditions annexed thereto, shall, failing agreement between the Board and the respective persons interested in such lands, be determined, on the application of the Board or any such person, by an arbitrator appointed

by the department, unless the parties agree on some other method of determination; and the Board may pay to any such person such sums as may be agreed upon, or may in default of agreement be determined by arbitration as aforesaid.

3. The payment of money by any such person shall not be made a term or condition of an award made under this section otherwise than with his consent.

8. When the application relates to a survey and sub-division into lots with a view to registration of the plan of a tract of land within one mile of the boundary lines of a city, town or rural municipality, the Local Board shall submit a copy of such application, including plans, sections and particulars, to the Local Board of the adjoining area for approval of the lines, widths and direction of such roads as form or are likely to form the principal means of communication between the adjacent areas.

PART III—PREPARATION AND APPROVAL OF TOWN PLANNING BY-LAWS AND SCHEMES

9. Except as hereinafter provided, each Local Board shall within three years after the passing of this Act prepare a set of town planning by-laws for adoption in its area, and provision shall be made therein for dealing with the matters set out in schedule "A" to this Act and such other matters as may be necessary for carrying the by-laws into effect, including the suspension of any by-law, rule, regulation or provision which is already in operation in the area.

2. The Department may prepare a set of model by-laws (or separate sets of model by-laws adapted for areas of special character) for the purpose of adoption by a Local Board.

3. Where a town planning scheme has been approved by the Department, the Local Board shall not be required to prepare or adopt a set of town planning by-laws under this section in respect of the portion of its area included in the proposed scheme.

4. If, at any period subsequent to the approval of a set of town planning by-laws, a Local Board prepares or adopts a town planning scheme for any part of a municipal area, provision shall be made therein for incorporating such by-laws as part of the scheme, except in so far as they may be altered or revoked in accordance with the requirements of this Act.

10. A town planning scheme may be prepared in accordance with the provisions of this Act with the general object of securing proper sanitary and hygienic conditions, amenity, and convenience, including suitable provision for traffic, in connection with the laying out of streets and use of the lands included therein, and of any neighbouring lands, for building or other purposes.

2. The Department may authorize a Local Board to prepare such a scheme with reference to any land within or in the neighbourhood of its area, if the Local Board satisfy the department that there is a *prima facie* case for making such a scheme, or may authorize

a Local Board to adopt, with or without modifications, any such scheme proposed by all or any of the owners of land with respect to which the Local Board might itself have been authorized to prepare a scheme.

11. A town planning by-law or scheme prepared or adopted by a Local Board shall not have effect, unless it is approved by order of the Department, which may refuse approval except with such modifications and upon such conditions as it may see fit to impose.

2. A town planning by-law or scheme shall take effect when approved of by the Department.

3. A town planning by-law or scheme may be varied or revoked by order of the Department, on the application of the Local Board or of any interested person, if the Department is satisfied that under the special circumstances of the case such by-law or scheme should be altered or revoked; but no scheme shall be revoked except by a subsequent scheme made and approved in accordance with this Act.

12. The authority to be responsible for the carrying out of town planning by-laws or a town planning scheme shall be the Local Board applying for approval of the scheme.

Provided that where land included in a town planning scheme is in the area of more than one Local Board, the responsible authority may be such Local Board or other authority as may be designated by the Department.

13. Every town planning scheme shall contain provisions for defining, as may be prescribed by the rules of the department:— (a) the area to which the scheme is to apply, and (b) the Local Board or other authority which is to be responsible for enforcing the observance of the scheme and for the execution of any works which under the scheme or the Act are to be executed by the Local Board or other authority.

2. Provisions shall also be inserted in every town planning scheme for carrying out the general object of schemes, for suspending as far as may be necessary for the proper execution of the scheme any statutes, by-laws, rules, regulations or other provisions, made by a local authority, which are in operation in the area included in a scheme and in particular for dealing with the matters set out in schedules "A" and "B" attached to this Act.

14. Special provision shall be inserted in every set of town planning by-laws and in every town planning scheme prescribing the manner in which the funds necessary for carrying the by-laws or scheme into effect are to be procured.

Provided that no assessment upon any city, town or rural municipality shall be authorized by such provisions without the consent of the local authority in control of the area affected being first had and obtained; nor shall any power to borrow money either by the issue of bonds or otherwise be conferred upon a Local Board by any by-laws or scheme, except with the approval of the local authority in control of the area affected.

2. The expenses to be incurred by the Local Board in preparing or adopting by-laws or a scheme shall be provided by the local authority, and such amount may be borrowed by the local authority. The amount so borrowed with the interest shall be included in the assessment and rating for the next municipal year, and shall not exceed, for the purpose of preparing and adopting by-laws, one-fiftieth, and for the purpose of preparing or adopting a town planning scheme, one twentieth, of one per cent of the assessed value of the city, town or other municipality.

15. The Department may make rules for regulating the procedure to be adopted with respect to applications for authority to prepare or adopt town planning schemes, the preparation of draft town planning by-laws or schemes, obtaining the approval of the department thereto, and any enquiries, reports, notices, maps, estimates, or other matter required in connection with the preparation or adoption or the approval of the by-laws or a scheme or preliminary thereto, or in relation to the carrying out of the by-laws or scheme, or enforcing the observance of the provisions thereof, and for such other purposes as may be found necessary.

2. Provision shall be made therein for securing:—

- (a) Co-operation on the part of the Local Board with other Local Boards and with the owners and other persons interested in the land proposed to be affected by the by-laws or included in the scheme;
- (b) For dealing with the other matters mentioned in Schedule "C" attached to this Act.

16. The Local Board may at any time, after giving such notice as may be provided in a set of town planning by-laws or a town planning scheme, and in accordance with the provisions of the by-laws or scheme:—

- (a) Remove, pull down or alter any building or other work in the area affected by the by-laws or included in the scheme which is such as to contravene their provisions or in the erection or carrying out of which any of their provisions has not been complied with; or
- (b) Execute work which it is the duty of any person to execute under by-laws or a scheme, where it appears to the Local Board that delay in the execution of the work would prejudice the efficient operation of the by-laws or the scheme.

2. Any expenses incurred by the Local Board under this section may be recovered from the persons in default in such manner and subject to such conditions as may be provided by the by-laws or the scheme.

3. If a question arises whether any building or work contravenes a by-law or a scheme, or whether any provision of a by-law or scheme is not complied with in the erection or carrying out of a building or work, such question shall be referred to the Department, and unless the parties agree upon some other manner for determining the question, it shall be determined by the Department and the

decision of the Department shall be final, conclusive and binding on all persons.

17. The Local Board may enter into an agreement with the owners of land to permit the formation or construction of streets or roads or the determination of a building line on their land, in accordance with the provisions of any draft by-laws or scheme, between the time when application is made to the Department for approval of the by-laws or authority to prepare the scheme and the time when such approval or such authority is given, subject to such agreement being approved by the Department; and may enter into an agreement with any person or corporation to do work that the Board has itself power to perform and, so far as may be necessary for the purpose of doing such work, such person or corporation shall have all the powers conferred upon a Local Board by this Act.

18. Any person whose property is injuriously affected by the making of town planning by-laws or a town planning scheme, shall, if he makes a claim for the purpose within the time (if any) limited by the by-laws or scheme (not being less than three months after the date when notice of the approval of the by-laws or scheme is published in the manner prescribed by regulations made by the Department) be entitled to obtain compensation in respect thereof from the Local Board.

2. Any person whose property is injuriously affected by the execution of works carried out under the provisions of by-laws or a scheme, in respect of any matter or thing which has not been the subject of compensation in connection with the making of the by-laws or the scheme, shall, if he makes a claim within twelve months after the completion of the work, or any section of the work affecting his property, as the case may be, be entitled to obtain compensation in respect thereof from the Local Board.

3. A person shall not be entitled to obtain compensation under this section on account of any building erected on, or contract made or other thing done with respect to land affected by by-laws or a scheme after the date when the Local Board makes application for approval of such by-laws, or for authority to prepare the scheme, as the case may be, or after such other time as the Department may fix for the purpose.

4. The foregoing provision shall not apply to prevent compensation for work done before the date of approval of the by-laws or scheme, for the purpose of finishing a building begun or of carrying out a contract entered into before the application was made.

19. Where, by the making of town planning by-laws or a town planning scheme, property is increased in value, the Local Board shall, if it makes a claim for the purpose within the time, if any, limited by the by-laws or scheme, such time not being less than three months after the date when notice of the approval of the by-laws or scheme is first published in the manner prescribed by the regulations, be entitled to recover from any person whose property is so increased in value one-half of the amount of the increase.

2. Where by the execution of works under by-laws or a scheme property is increased in value, the Local Board may recover from the owner one-half of the increase in respect of any matter or thing for which it has not recovered any amount in connection with the making of the scheme, provided that it makes a claim within twelve months after the completion of the work or any portion of the work affecting the property, as the case may be.

20. Any question as to whether property is injuriously affected or increased in value, and as to the amount and manner of payment (whether by instalments or otherwise) of the sum which is to be paid as compensation, or which the Local Board is entitled to recover, shall be determined by a single arbitrator appointed by the Department, unless the parties agree on some other method of determination.

2. Any amount due as compensation from a Local Board to a person aggrieved, or to a Local Board from a person whose property is increased in value, may be recovered summarily as a civil debt.

3. When a by-law or a scheme is altered or revoked by an order of the Department under this Act, any person who has incurred expenditure for the purpose of complying with the by-law or scheme shall be entitled to compensation from the Local Board, in accordance with this section, in so far as any such expenditure is rendered abortive by reason of the alteration or revocation of the by-law or scheme.

21. Where property is alleged to be injuriously affected by reason of provisions contained in town planning by-laws or a town planning scheme, no compensation shall be paid in respect thereof, if or so far as the provisions are such as would have been enforceable if they had been contained in by-laws made by the local authority under any other Act.

2. Property shall not be deemed to be injuriously affected by reason of the making of any provisions inserted in by-laws or a scheme, which, with a view to securing the amenity of the area affected by the by-laws or the scheme, or any part thereof, or proper hygienic conditions in connection with the buildings to be erected thereon, prescribe the space about buildings, or the percentage of any lot which may be covered with buildings, or limit the number of buildings to be erected, or prescribe the height, character or use of buildings, and which the Department, having regard to the nature and situation of the land affected by the by-laws or provisions, consider reasonable for the purpose of amenity and proper hygienic conditions.

3. Where a person is entitled to compensation under this Act in respect of any matter or thing, and he would be entitled to compensation in respect of the same matter or thing under any other enactment, he shall not be entitled to compensation in respect of that matter or thing both under this Act and under that other enactment, and shall not be entitled to any greater compensation under this Act than he would be under the other enactment.

PART IV—PURCHASE OR EXPROPRIATION OF LAND

22. The Local Board is hereby authorized to acquire property by gift, purchase or expropriation.

23. The Local Board may, for the purpose of a town planning scheme, purchase or acquire any land comprised in such scheme by agreement or compulsorily, including any land within 200 feet of the boundary lines or proposed boundary lines of any street laid out, widened or improved by the Board, or any public park, playground or other open space acquired by the Board under a scheme, and in the absence of agreement the price to be paid shall be determined by arbitration, under the rules set out in schedule "D" to this Act.

2. In determining the amount of compensation to be paid for land expropriated for any purpose of a scheme, the arbitrators shall take into consideration the relative benefit and injury occasioned to any remaining portion of the owner's land by carrying the scheme or any portion thereof into effect, adding thereto, in the case of injury, an estimate for the cost of fencing such portion, if fencing be rendered necessary.

3. The price to be paid for land so purchased or expropriated shall in no case exceed the assessed value thereof, plus 25 per cent of such value, at the date when the application for authority to prepare the scheme was made, and no additional allowance shall be made because of the purchase being compulsory.

24. A Local Board may be authorized by the Department to sell land purchased or expropriated under a town planning scheme if it can be shown that the purpose for which the land was acquired has been attained or that the land is no longer necessary for any purpose of the scheme.

2. The monies realized from such sale shall be applied in the first instance, to the payment of any debt incurred in connection with the expropriation, and for that purpose may be used for payment of the instalments of any loan contracted for such debt, or may be paid into a sinking fund established in connection therewith, or into the general sinking fund, as may be most appropriate; and they may thereafter be applied to such purposes in connection with the scheme as may be approved by the Department.

PART V—POWERS IN CASE OF DEFAULT AND TO
INSPECT PROPERTY

25. If the Department is satisfied, on any representation, and after inquiry that a Local Board:—

- (a) Has failed to take the requisite steps for having a satisfactory set of town planning by-laws or a town planning scheme prepared and approved in a case where a set of by-laws or a scheme ought to be made; or
- (b) Has failed to adopt a scheme proposed by owners of land in a case where a scheme ought to be adopted; or

- (c) Has failed to prepare a set of by-laws dealing with any part of its area not included in a scheme; or
- (d) Has unreasonably refused to consent to modifications or conditions imposed by the Department, the Department may, as the case requires, order the Local Board to prepare and submit for its approval such a set of by-laws or scheme, or to adopt the scheme, or to consent to the modifications or conditions so inserted.

2. Where the representation is that a Local Board has failed to adopt a scheme, the Department, in lieu of making such an order as aforesaid, may approve the proposed scheme, subject to such modifications and conditions, if any, as it may deem fit, and thereupon the scheme shall have effect as if it had been adopted by the Local Board and approved by the Department.

3. If the Department is satisfied on any representation, after holding a public local enquiry, that a Local Board has failed to enforce effectively the observance of a set of by-laws or a scheme which has been confirmed, or any provisions thereof, or to execute any works, which, under the by-laws or scheme or this Act, the Board is required to execute, the Department may order the Board to do all things necessary for enforcing the observance of the by-laws or scheme or any provisions thereof, effectively, or for executing any works which under the by-laws or scheme or this Act, the Board is required to execute.

4. Any order under this section may be enforced as by mandamus.

26. The Local Board, or any of its officers or servants, on production of the written authority of the Board, shall be admitted into or upon any property within its area for the purposes of any inspection required to be undertaken in connection with the work of preparing by-laws or a scheme, or carrying out the provisions of such by-laws or scheme, and if admission is refused any magistrate, on complaint thereof on oath by an officer of the Board (made after reasonable notice in writing of intention to make the same has been given to the person having custody of the property) may by order under his hand require such person to admit the Board and its officers or servants into or upon such property during such reasonable hours as he shall think fit, and if no person having such custody can be found the justice shall, on oath made before him of that fact, by order under his hand authorize the Board and its officers or servants to enter such property during the hours aforesaid.

2. Any such order made by a magistrate shall continue in force until the purposes for which such admittance was required shall have been fulfilled or executed.

PART VI—EXPENSES OF DEPARTMENT, ETC.

27. Expenses incurred by the Department under this Act shall be paid out of any funds appropriated for the purpose by the Legislature of the Province.

28. The Minister shall make an annual report to the Legislature, containing the decisions, recommendations and other transactions of his Department under this Act, and shall prepare and keep for inspection a map on which shall be shown the main thoroughfares of the province so far as the position and line of such thoroughfares have been determined by the Board of Highway Commissioners of the province.

29. This Act shall come into force on the

SCHEDULE "A"

(Sections 6, 9 and 13)

MATTERS TO BE DEALT WITH IN TOWN PLANNING BY-LAWS OR SCHEMES

1. Fixing building lines on all existing streets and roads to secure, as far as practicable, having regard to the physical features of the site and the depths of the existing sub-divisions, that the distance between the buildings to be erected or buildings likely to be reconstructed on opposite sides of a street or road shall not be less than 80 feet and may be 120 feet according to the prospective traffic requirements of such road.

2. Fixing building lines on all new streets and roads to be made in future so that no building shall be nearer to the centre of any road than 60 feet in the case of main thoroughfares or 40 feet in the case of all other roads.

3. Reserving land for new main thoroughfares which it is desired to keep free from buildings, by agreement with the owner or owners of such land and by co-operation between Local Boards with regard to the lines, widths and direction of thoroughfares which connect adjacent parts of their respective areas.

4. Limiting the number of separate family dwelling houses to the acre and providing for adequate light and air to the windows of each house, so far as reasonable for the purpose of securing the amenity of any area, and proper hygienic conditions in connection with the buildings erected thereon.

5. Prescribing zones within which to regulate the density of building for the purpose of securing amenity or proper hygienic conditions, and fixing the percentage of the area of the lot on which new buildings may be erected or old buildings reconstructed, so that not more than 75 per cent of any lot situate within the central or commercial zone of a city or town and not more than 50 per cent of any lot situate in any outer zones, shall be covered with buildings, except in regard to corner lots fronting on two intersecting streets, in which case the percentage may be increased to 90 and 60 per cent in the central and outer zones respectively.

6. Prescribing certain areas which are likely to be used for building purposes, for use for dwelling houses, apartment houses, factories, warehouses, shops or stores, or other purposes and the height or general character of buildings to be erected or reconstructed; so far as reasonable for the purpose of securing the amenity of such areas, and proper hygienic conditions in connection with such buildings.

7. Prohibiting the carrying on of any noxious trades or manufactures or the erection and use of any buildings with inadequate sanitary arrangements or the erection and use of buildings, bill boards or structures for advertising purposes which are such as to be injurious to the amenity or natural beauty of any area.

8. Providing for the following or other variations in the width of streets:—

- (a) New main thoroughfares to be of a width of not less than 100 feet.
- (b) New secondary streets likely to be required for through traffic to be of a width of not less than 40 feet.
- (c) Streets not exceeding 350 feet in length and in the opinion of the Local Board, not required for through traffic, to be of a width of not less than 24 feet with a carriage way not less than 16 feet and connecting at both ends with a street not less than 40 feet wide.
- (d) Streets not exceeding 700 feet in length, and in the opinion of the Local Board, not required for through traffic, to be of a width of not less than 28 feet, with a carriage way of not less than 18 feet, and connecting at both ends with streets not less than 40 feet wide.
- (e) Streets not exceeding 1,500 feet in length, and, in the opinion of the Local Board, not required for through traffic, to be of a width of not less than 32 feet, with a carriage way of not less than 21 feet, and connecting at both ends with a street not less than 40 feet wide.

SCHEDULE "B"

(Section 13)

MATTERS WHICH MAY FORM THE SUBJECT OF PROVISIONS IN A TOWN PLANNING SCHEME

- 1. Streets, tramways, roads and other ways, including stopping up, altering or diverting of existing highways.
- 2. Buildings, structures and erections.
- 3. Open spaces, private and public.
- 4. Preservation of objects of historical interest or natural beauty.

5. Sewerage, drainage and sewage disposal.
6. Lighting.
7. Water supply.
8. Ancillary or consequential works.
9. Extinction of variation of private rights-of-way and other easements.
10. Use or disposal of land acquired by a Local Board.
11. Power of the Local Board to remove, alter or demolish any buildings or obstructive work.
12. Power of the Local Board to make agreements with owners' and of owners to make agreements with one another.
13. Power of the Local Board to accept any money or property for the furtherance of the objects of any town planning scheme, and provisions for regulating the administration of any such money or property.
14. Application with necessary modifications and adaptations of statutory enactments.
15. Carrying out and supplementing the provisions of this Act for enforcing schemes.
16. Limitation of time for operation of scheme.
17. Co-operation of the Local Board with the owners of land included in the scheme, or other person interested by means of conference and other means.
18. Charging against land the value of which is increased by the operation of a town planning scheme the sum required to be paid in respect of that increase.
19. Any special circumstances or contingencies relating to the area included in the scheme.

SCHEDULE "C"

(Section 15)

1. *Procedure anterior to and for the purpose of an application for authority to prepare or adopt a town planning scheme.*
 - (a) Deposit for inspection of maps and particulars of the proposed area by the Local Board.
 - (b) Submission of maps, particulars and estimates of cost of preparing scheme to Department.
 - (c) Publication of notices, including earliest possible notice of the proposal to prepare a scheme.
 - (d) Hearing of objections and representations with regard to the boundaries or extent of the area by persons interested.
2. *Procedure during, on and after the preparation or adoption and before the approval of the scheme.*

- (a) Deposit for inspection of draft scheme and maps relating thereto.
- (b) Submission of the proposed scheme to Department, with plans and estimates.
- (c) Notice of submission of proposed scheme to Department.
- (d) Hearing of objections and representations by persons affected, including persons representing architectural or archaeological societies, or otherwise interested in the amenity of the area.
- (e) Publication of notice of intention to approve scheme and the lodging of objections thereto.

3. *Procedure in case of modification of proposed scheme.*

- (a) Notice to be given of proposed modifications.
- (b) Hearing of objections or representations to modifications, by persons interested.

4. *Procedure after approval of the scheme.*

- (a) Notice to be given of the approval of the scheme.
- (b) Inquiries and reports as to beginning and the progress and completion of works and other action under the scheme.

5. *Procedure for the purpose of an application to prepare or adopt town planning by-laws.*

- (a) Publication of notices of proposed application and deposit for inspection of draft by-laws and any maps relating thereto.
- (b) Submission of draft by-laws and any maps relating thereto to Department.
- (c) Hearing of objections and representations by persons interested.
- (d) Publication of notices of intention to approve by-laws and lodging of objections to any modifications made thereto.
- (e) Deposit of by-laws as approved by Department and publication of notice of approval.

6. *General requirements.*

- (a) The details to be specified in plans, including, wherever the circumstances so require, the restrictions on the number, location, purpose and dimensions of buildings which may be erected on each area, and the height and character of such buildings.
- (b) Duty of the Local Board to give information to persons affected with reference to any by-laws or schemes or proposed by-laws or scheme.
- (c) Duty of Department to hold or order the holding of any public inquiry which it deems necessary or desirable.

SCHEDULE "D"

(Section 22)

REGULATIONS AS TO EXPROPRIATION OF LAND

1. Where under a town planning scheme it is provided that land may be purchased for any purpose connected with the scheme, the Local Board may contract for the purchase of such land or an interest therein with the owner thereof.

2. If:—

- (a) No such contract can be made; or
 - (b) Such owner or person does not reside within the province or is not known by the Local Board so to reside; or
 - (c) A good title cannot be made to such land or interest, or the owner or any other person interested therein is incapable of executing a good conveyance thereof; or
 - (d) For any other reason it is deemed advisable so to do;
- the Local Board may by resolution determine to expropriate such land or interest.

3. If any such owner, or other person having the power to sell, fails to answer, within thirty days after the receipt thereof, an offer in writing by the Local Board to purchase such land or interest, such failure may be deemed a refusal to contract.

4. The surveyor of the Local Board shall prepare a plan and description of the land proposed to be expropriated and a report on the matter of such expropriation, and submit the same to the Board.

5. For any purpose connected with such contemplated expropriation, any officer of the Local Board, his associates and servants may enter upon the land and survey or examine the same, and, if necessary in his judgment, may make borings or other excavations therein, and if such expropriation is not made, any damage to the land shall be paid for by the Local Board.

6. A copy of such plan and description as approved by the Local Board shall be lodged in the office of the surveyor, where the same may be inspected by any person interested.

7. If the owner of the land or an interest therein intended to be expropriated resides within the province, and is known to the Local Board, the surveyor shall give him notice in writing of the intention of the Board to expropriate such land or interest, but the notices required to be given under the procedure regulations of the Department shall be deemed to be sufficient notice for the purposes of this Act.

8. It shall not in any case be necessary to serve mortgagees of land sought to be expropriated with a copy of such notice.

9. At the expiration of two weeks from the giving of such notice the Local Board may, by resolution, declare the land or interest therein to be expropriated, and shall pay into the Supreme Court

such sum as in its judgment is a reasonable compensation therefor, and notice of the payment shall be given to such person and by such publication as is hereinbefore provided in respect to the notice of intention to expropriate.

10. A copy of such resolution, with a copy of the plan and description shall be lodged for registry in the land titles office for the land registration district in which the land is situated.

11. Upon the passage of such resolution the making of such payment and the lodging for registry of such documents, the title to the land or interest therein declared to be expropriated shall be absolutely vested in the Local Board free from any encumbrance or lien of any description whatever.

12. If resistance or opposition is made to the official of the Local Board entering upon and taking possession of land on behalf of the Board, a judge of the Supreme Court, on proof of the passing of such resolution, the lodging of such plan in the office of the surveyor and in the land titles office, and the payment of the money into court, and after notice to show cause given in such manner as he directs, may issue his warrant to the sheriff of the judicial district within which such lands are situated, directing him to put down such resistance or opposition, and to put the Local Board in possession thereof; and the sheriff shall take with him sufficient assistance for the purpose, and shall put down such resistance and opposition, and shall put the Board in possession thereof; and shall forthwith make return to the Supreme Court of such warrant and of the manner in which he executed the same.

13. If the owner, within one month from the service upon him of such notice of payment, gives notice in writing to the Local Board that the amount of such compensation is insufficient and names a person as arbitrator, the Local Board shall forthwith name an arbitrator, and the two so named shall appoint a third, or, if they are unable to agree, such third arbitrator shall be appointed by the department, and the three arbitrators so appointed shall determine the amount of the compensation, and shall file their award with the surveyor and the provisions of The Arbitration Act shall apply to any proceedings had by the arbitrators.

Provided that no expert witness as to value, nor counsel shall be heard except by request of the arbitrators, or in such cases as the Department may direct.

14. The owner and the Local Board may, if they see fit, appoint one person sole arbitrator, and the compensation may be determined by him.

15. If the owner does not give such notice and name an arbitrator within one month he shall be deemed to have accepted the amount of compensation paid into court as sufficient but in such case any person who is holder of a charge or incumbrance on the land expropriated, or is otherwise interested therein, may give such notice and name an arbitrator within one week from the expiry of the month, and the arbitrator shall proceed accordingly.

16. An arbitrator, who is not by profession a barrister, solicitor, engineer, architect or Dominion or provincial land surveyor, shall not be entitled to take or demand for his attendance and services as an arbitrator any greater fees than the following:—

For every meeting where the reference is not proceeded with, but a postponement is made at the request of any party.....	\$ 2.00
For every day's sitting, where the reference is actually proceeded with, for each hour occupied, not less than.....	1.00
Nor more than.....	2.00

17. An arbitrator, who is by profession a barrister, solicitor, engineer, architect or Dominion or provincial land surveyor, shall not be entitled to take for his attendance and services as an arbitrator any greater fees than the following:—

For every meeting where the reference is not proceeded with, but a postponement is made at the request of any party.....	\$ 5.00
For every meeting where the reference is actually proceeded with, for each hour occupied, not less than.....	2.00
Nor more than.....	5.00

18. Where a meeting, at which the reference is actually proceeded with, is less than six hours in duration, fractional parts of an hour shall be excluded in computation of an arbitrator's fees. Otherwise a fractional part of an hour shall be counted as a full hour.

19. The parties to a submission may agree, by writing signed by them or by making such agreement a part of the submission, to pay to the arbitrator or to the arbitrators, if more than one, such fees for each day's attendance, or such gross sum for taking upon themselves the burden of the reference and making the award, as the parties see fit, and in every such case the fees or sum so agreed upon shall be substituted for those above mentioned, and shall be taxed by the taxing officer accordingly.

20. No greater fees shall be taxed to a person called as a witness before an arbitrator than could be taxed to him in an action in the Supreme Court.

21. Any party to an arbitration shall be entitled to have the costs thereof, including the fees of the arbitrators, or such fees alone, taxed by the proper officer of the Supreme Court, in the judicial district in which the land lies, upon an appointment which may be given by the officer for that purpose, on the filing of an affidavit setting forth the facts.

(2). A taxation of the fees of the arbitrators may be had upon an appointment given at the instance of the arbitrators or any of them upon a like affidavit.

22. The taxing officer shall in no case tax higher fees than those mentioned in sections 16 and 17, but, upon reasonable grounds, he

may reduce the maximum mentioned therein, having regard to the length of the arbitration, the value of the matter in dispute, and the difficulty of the questions to be decided.

(2.) Such officer shall not reduce the fees below the minimum mentioned in sections 16 and 17, nor shall he tax more than one counsel fee to either party for any meeting of the arbitrators.

(3.) The taxing officer may tax a reasonable sum for preparing the award.

(4.) An appeal may be had from such taxation in the same manner as from a taxing officer's certificate of taxation in an action.

23. In the event of the Local Board proceeding to expropriate a tract of land, the property of more than one person, the Board may give notice by advertisement for two weeks, in one or more daily newspapers published in the locality, of a time and place at which the owners of land proposed to be taken may meet, and may also give notice of such meeting by letter prepaid to such of the owners as are known; but the want of notice by letter shall not affect the expropriation proceeding. Such meeting shall be presided over by the mayor, warden, or other person appointed by the Board.

24. At such meeting the owners may, by a majority vote of those present, nominate a person to be one of the arbitrators to determine the compensation to be paid by the Board for the respective lands so taken.

25. If such owners fail to meet or to appoint a person at such meeting, a judge of the Supreme Court may, on the application of the Board, appoint a person to be such arbitrator.

26. The Board shall appoint one person to be an arbitrator for such purpose.

27. The two persons so appointed shall appoint a person to be a third arbitrator, and if they are unable or fail within one week of their appointment to agree upon any such person a judge may, on the application of the Board or of any owner, appoint a person to be such third arbitrator.

28. The three persons so appointed shall be the arbitrators to determine the compensation to be paid in respect to each of the properties expropriated.

29. If the amount of compensation determined by the arbitrators exceeds the amount paid into court, the Local Board shall pay the amount of the excess into court. If such amount is less than the amount paid into court, the difference may be paid out to the Board on application.

30. Money paid into court on account of an expropriation shall be subject to every lien, incumbrance or other charge to which the land or interest therein expropriated was subject.

31. Money paid into court may be paid out to the persons entitled thereto on application to a judge of the court, notice of

such application being first given to the Local Board, and on such application the judge shall make such orders and direct such notices to be given as he deems necessary to protect all persons interested in the money so paid in.

32. If upon any application for the payment out of money a certificate of title is required, the registrar of titles for the land registration district in which the land lies, shall furnish the same for a fee of ——— dollars, to be paid by the Local Board.

33. The Board shall pay the cost of any such application not exceeding fifteen dollars in all.

Appendix III

Fire Waste Facts and Figures

DURING the five year period ending December 31st, 1914, 31,400 fires, exclusive of forest conflagrations, destroyed Canadian property valued at \$115,000,000.

This destruction of our national wealth averages \$23,000,000 per annum, or over \$63,000 daily, and equals:

3.5%	of the total value of Canada's	Agricultural Field Crops	
9%	"	"	Steam Railway Earnings
13%	"	"	Forest Production
14%	"	"	Consolidated Fund Revenue
17%	"	"	Mineral Production
19%	"	"	Paid-up Bank Capital
74%	"	"	Fisheries Production
77%	"	"	Electric Railway Earnings
143%	"	"	Gold Production
153%	"	"	Silver Production
176%	"	"	Net Postal Revenue

If the annual expenditure upon fire protection and insurance is added to the value destroyed, fires cost Canada directly and indirectly as follows:

	Investment in Construction and Equipment	Annual Loss and Expense
FIRE LOSS		
Annual Fire Loss (average of five years).....		\$23,000,000
INSURANCE PROTECTION		
Amount of Fire Premiums in excess of Losses paid		13,500,000
WATERWORKS		
Total cost of waterworks chargeable to Fire Service	\$24,500,000	
Supply and Distribution.....\$22,050,000		
Hydrants.....2,450,000		
Total Annual Expense of Waterworks chargeable to		
Fire Service.....		3,035,000
Depreciation and Taxes.....1,225,000		
Interest Charge.....980,000		
Maintenance.....830,000		
FIRE DEPARTMENTS		
Total Cost of Fire Departments—Buildings and		
Equipment.....	10,975,000	
Total Annual Expense of Fire Departments.....		5,797,125
Depreciation and Taxes on Build-		
ings and Equipment.....823,125		
Interest Charge.....439,000		
Maintenance.....4,535,000		
PRIVATE FIRE PROTECTION		
Total Cost of Private Apparatus and Protective		
Systems.....	11,500,000	
Total Annual Expense.....		4,356,000
	\$46,975,000	\$40,688,125

Rates for insurance in Canada have averaged during the last three years \$1.22 per \$100 insured. The average rate in Sweden is 40 cents, in Austria 30 cents, in England 23 cents, in Germany 22 cents, in France 21 cents (est.), in Spain 19 cents, in Italy 19 cents.

The reason for the difference is obvious when fire losses are compared as in the following table:

Canadian Cities, 1914

	Alarms	Loss	Per Capita Loss	Alarms per 10,000 Pop.
Saskatoon.....	182	\$ 301,719	\$12.07	72
Fort William.....	144	190,008	7.91	60
Vancouver.....	642	677,801	6.77	64
Halifax.....	270	316,200	6.73	57
Brockville.....	47	42,786	4.74	52
Port Arthur.....	180	81,530	4.53	45
Chatham.....	63	50,547	4.20	52
London.....	264	200,457	3.64	48
Quebec.....	662	290,301	3.62	82
Ottawa.....	522	342,792	3.38	51
Montreal.....	3547	1,800,000	3.27	65
Stratford.....	52	50,457	3.15	32
Toronto.....	2137	1,457,279	3.10	45
Hamilton.....	433	312,314	3.09	46
Belleville.....	39	34,000	2.83	32
St. Thomas.....	77	45,081	2.80	48
Winnipeg.....	345	491,213	2.34	17
St. John.....	247	140,000	2.33	23
Edmonton.....	550	159,643	2.20	76

Foreign Cities, 1914

	Alarms	Loss	Per Capita Loss	Alarms per 10,000 Pop.
London, Eng.....	6125	\$2,750,000	\$0.60	13
Leeds.....	298	377,080	.84	6
Sheffield.....	382	110,950	.23	7
Bolton.....	63	175,745	.93	3
Cardiff.....	168	99,770	.55	8
Lancaster.....	12	1,490	.04	3
York.....	35	6,740	.08	4
Belfast.....	164	181,385	.46	3
Dublin.....	251	78,250	.22	6
Bordeaux.....	391	158,958	.61	15
Marseilles.....	500	433,528	.79	9
Paris.....	4366	1,730,943	.61	15
Florence.....	193	40,132	.17	8
Milan.....	988	320,104	.48	16
Christiania.....	388	121,386	.48	16
Madrid.....	820	92,000	.15	13
Stockholm.....	735	206,752	.54	18
Basle.....	91	27,993	.19	6
Tokio.....	521	684,346	.34	2

Appendix IV

Bird Conservation in Labrador*

BY

CHARLES WENDELL TOWNSEND, M.D.

Ornithologist, temporarily on the Staff of the Geological Society

IN the latter part of the eighteenth century, in the time of Cartwright, water birds swarmed along the coast of the Labrador peninsula. The Eskimos and the Indians, the polar bears and the raptorial birds served but to keep the bird colonies in healthy condition. White man is more systematic in his methods and more thorough, especially when stimulated by the expectation of financial gain, and, if conservation is not practised, he will eventually exterminate the creatures of his quest. This was true in the case of the buffalo and the passenger pigeon and the same fate awaits many other beasts and birds.

In Audubon's day the despoilers of Labrador bird rookeries plied their trade without let or hindrance. Audubon, in his visit to the southern coast in 1833, was filled with horror on observing their cruel methods and their ruthless destruction of his beloved bird life. He writes:

"See yon shallop, shyly sailing along; she sneaks like a thief, wishing, as it were, to shun the light of heaven. Under the lee of every rocky isle some one at the tiller steers her course. * * * There rides the filthy thing! The afternoon is half over. Her crew have thrown their boat overboard, they enter and seat themselves, each with a rusty gun. One of them sculls the skiff towards an island, for a century past the breeding-place of myriads of Guillemots, which are now to be laid under contribution. At the approach of the vile thieves, clouds of birds rise from the rocks and fill the air around, wheeling and screaming over their enemies. Yet thousands remain in an erect posture, each covering its single egg, the hope of both parents. The reports of several muskets loaded with heavy shot are now heard, while several dead and wounded birds fall heavily on the rock, or into the water. Instantly all the sitting birds rise and fly off affrighted to their companions above, and hover in dismay over their assassins, who walk forward exultingly, and with their shouts mingling oaths and execrations. Look at them! See how they crush the chick within its shell, how they trample on every egg in their way with their huge and clumsy boots. Onward they go, and when they leave the isle, not an egg that they can find

*Advance chapter of "In Audubon's Labrador," by Dr. C. W. Townsend. Published by permission of the author.

is left entire. The dead birds they collect and carry to their boat. * * * The light breeze enables them to reach another harbour a few miles distant, one which, like the last, lies concealed from the ocean by some other rocky isle. Arrived there, they re-act the scene of yesterday, crushing every egg they can find. For a week each night is passed in drunkenness and brawls, until, having reached the last breeding place on the coast, they return, touch at every isle in succession, shoot as many birds as they need, collect the fresh eggs, and lay in a cargo. At every step each ruffian picks up an egg so beautiful that any man with a feeling heart would pause to consider the motive which could induce him to carry it off. But nothing of this sort occurs to the egger, who gathers and gathers until he has swept the rock bare. The dollars alone chink in his sordid mind, and he assiduously plies the trade which no man would ply who had the talents and industry to procure subsistence by honourable means."

Mr. M. Abbott Fraser,* in 1884, was much impressed with the destruction of bird life by the fishermen. He says: "During the week the men are all busy out in their dories fishing, but their Sundays are their own and are generally spent on the islands gathering eggs and shooting birds, and they stop at nothing, but shoot everything which flies whether eatable or not, and shoot just for the sport they find in destruction; and as they keep it up during the whole season the poor birds have but a slim show." He also saw a few Halifax eggers on the coast.

Mr. D. N. Saint-Cyr visited the Canadian Labrador coast in 1882 and 1885. He says:† "It is unfortunately too true that certain settlers on the coast, but more especially strangers, from Nova Scotia, from the state of Maine and the island of Newfoundland, pillage the sea-birds' eggs, which they carry off to sell in their own country. These years past as many as thirty schooners have been counted, engaged in obtaining loads of wild birds' eggs in the islands of the Gulf, and, to make matters worse, when these pillagers observe that the eggs are hatching, they break them, in order that the old birds may lay more. Then all these fresh eggs are taken away, and it is thus that thousands upon thousands are destroyed every year."

The visits of the Halifax eggers, for commercial purposes, have long since ceased, but the robbery of eggs and the destruction of nesting birds still continues. The conditions, as I found them in my four trips to the Labrador peninsula, which have included a survey of 1,100 miles of the coast, from the bay of Seven Islands to Nain, are most deplorable, and are rapidly leading to the utter extinction of the water birds. Spring shooting confined to migrating birds, although undesirable, is not so pernicious in its effect as the shooting of birds on their arrival at their breeding grounds. This is practised in the case of all the birds that nest on the coast. At Perroquet island, in Bradore bay, for example, the arrival of the puffins or "perroquets" in the spring is eagerly awaited by the inhabitants,

* *Ornithologist and Oologist*, Vol. 12, 1887.

† *Sessional Papers* No. 37, Quebec, 1886.

who make the occasion a great holiday. They encamp for several days on the island and shoot down the poor birds as they fly in a bewildered manner around and around their homes. I was told by one man with great glee that he sometimes shot two hundred birds in a day. He added that the wounded birds were generally lost, as they crawled into their nesting holes. I, myself, in 1909, witnessed, on another island, where puffins bred, this cruel sport. The birds, bewildered and frightened by the shooting, circled about the island, and were picked off by the gunner as they flew past. At Perroquet island the boys who have no guns strike down the birds with long poles. The whole village feasts on the puffins and many are wasted or given to the dogs. Throughout the summer the island is visited by fishermen, who not only shoot the birds, but also dig them out of their nesting holes and secure them in nets spread over the holes. In many cases the young are left to perish. The Newfoundland fishermen are undoubtedly the worst offenders in egg and bird destruction, but the people of the coast are not far behind. The former are absolutely ruthless of consequences for the birds, but the people of the coast in some few cases are careful not to disturb the birds after the first eggs have been appropriated. The case of the island near pointe au Maurier, where ring-billed gulls breed, is an example. Here for many years the sole family living at this place had been in the habit of looking to the island for a supply of fresh eggs, but they never disturb the birds after they have taken the first set of eggs. The bird colony has in consequence suffered no diminution, and has even increased in numbers.

The shooting of female eider ducks as they leave their nests involves, of course, the loss of the brood. The eggs themselves may be discarded on account of the advanced stage of incubation. The fishermen take the eggs to a pool of water and save only those that sink. The ones that float contain partly or wholly formed young and are thrown away. If the men intend to stay near the breeding place for a few days they destroy all the eggs, so that a fresh lot may be laid for them to appropriate.

Nesting murres are shot or killed with clubs. Most of these birds are eaten, but nesting gulls, terns and cormorants are often shot for the cruel pleasure and practice of the sport, and left where they fall. It is almost inconceivable that men should destroy such exquisite creatures as terns and gulls without even intending to pick them up and look at them, but it is a sad commentary on humanity that such "sport"—God save the mark—is not infrequently indulged in by men of education and supposed refinement. I have known men of this class to hold up their hands in horror at an ornithologist who had shot a small bird for the distinct object of study and of addition to human knowledge. Another cruel sport, that is frequently practised by thoughtless people, is the firing of guns near rookeries for the purpose of seeing the frightened birds jump from their eggs. As a result of these practices the cliffs of cape Whittle are now nearly deserted by birds.

I obtained from reliable sources, often from the offenders themselves, numerous reports of great quantities of murre and eider eggs

collected for their consumption by the crews of fishing schooners. Many of these vessels are scantily and poorly provisioned and make up for this by inroads on the birds. Up to a few years ago a dozen barrels of murre eggs have been collected by a crew of twenty men from one island. As many of the terrified nesting birds are clubbed and shot as possible. The manner in which bird life is squandered at such times is almost too terrible to be thought of.

Besides the eggs and nesting birds, the young of several species of water birds, particularly of the great black-backed gull, are eagerly sought for the table. Sometimes the young are confined in coops and fattened before killing. The fact that this gull sometimes destroys young eiders and the eggs of nesting birds is often seized upon as an excuse for destroying both old and young of this species, but the majority ask no excuse.

The recent adoption and increasing use of motor boats is putting the finishing touches on the birds. The fishermen are enabled to traverse much greater areas of the coast, to reach distant islands where birds are nesting, and to more readily approach birds on the water. Going to and from the fishing grounds the motor boat enables its owner to take wide detours and gather cargoes of eggs and nesting birds. When sails and oars are used these out-of-the-way spots are fairly safe.

The destruction wrought by the Indians during their summer sojourn on the coast is increasing as other sources of food are diminishing.

If the treatment of the bird population in Canadian Labrador, where there are laws and game wardens, is bad, that in Newfoundland Labrador, where there appears to be neither, is still worse. In 1906 I found a bad state of affairs* and a rapidly diminishing water bird population. Mr. A. C. Bent, who visited this coast in the summer of 1912, says:† "I have heard that the sea birds on the Labrador coast were disappearing, but was not prepared to find them so scarce as they proved to be. They seem to have decreased very decidedly during the past few years, and, unless something can be done to protect them, many species will soon have disappeared entirely. Their nests are robbed persistently all during the summer by the resident white people, by the Eskimos, and by the large number of Newfoundland fishermen that visit the coast in the summer. The birds are also shot freely for food at all seasons of the year."

The whole outlook is indeed a gloomy one. It was thoroughly understood by Audubon in 1833. He says: "Nature herself seems perishing. Labrador must slowly be depopled, not only of aboriginal man, but of all else having life, owing to man's cupidity. When no more fish, no more game, no more birds exist on her hills, along her coasts, and in her rivers, then she will be abandoned and deserted like a worn-out field."

It is an old custom, and the wastefulness and terrible cruelty of it all does not appear to penetrate to these men's consciences. The

* See "*Along the Labrador Coast*."

† *Bird Lore*, 1913, Vol. XV, p. 11.

people who live along the coast and the fishermen who come from a distance have always been in the habit of taking eggs and killing the birds for food. They regard it as their right, and, although some of them will admit that the wasteful methods used are fast destroying the birds, they are not willing to refrain from these methods. They say with reason that if they do not take these eggs or young gulls, or shoot these setting ducks, some one else will. It is each man for himself and the devil take the hindmost. Annihilation is the fate of the birds; the eider and the murre will go the way of the Labrador duck and the great auk. Birds that nest in crevices in the rocks, like black guillemots and razor-billed auks, will last longer, but the end is in sight for all.

It is a truism that laws out of sympathy with the feeling of the people will not be kept. Laws against eggging or shooting out of season can not be enforced on the long and intricate coast of Labrador. Wardens who intend to do their duty and arrest and prosecute offenders will be looked upon as enemies to be avoided and cheated, and this by an otherwise law-abiding people.

There is one very simple means which would help in enforcing the present laws in Canadian Labrador. Newfoundland fishermen, who are the most reckless offenders, are obliged to obtain licenses to fish in Canadian waters. The law requires that they not only obey the game laws, but that they also take out at some expense licenses to carry guns and shoot. If the presence of an unlicensed gun on a fishing schooner or the detection in eggging be made a sufficient reason for cancelling the fishing license, one of the great sources of bird destruction will be diminished but not by any means stopped. It is easy to conceal guns and elude wardens on this long and intricate coast.

The open season for shooting should be intelligently planned for different parts of the coast, and should be strictly limited to the periods when the birds are migrating. It is of course illogical to have the same open season at Blanc Sablon as at Nain, where the birds nest several weeks later.

These suggestions, if adopted, may be of some value, and may delay for a little the rapid progress towards annihilation of water-bird life in Labrador. That these or any similar measures will prevent this dreaded consummation I do not believe.

What then is to be done? Is there no hope for the birds and for the people to whom the birds are such a valuable asset? I think there is. I believe that the whole problem can be solved most rationally and satisfactorily for all concerned by the immediate establishment of *bird reservations*. These should be islands or groups of islands or suitable portions of the main coast that can be watched by guardians. Here the birds should be undisturbed and allowed to rest, feed and breed in peace. The people should be made to understand that these reservations are not established to cut down their hunting, and thereby invite poaching and violation of the laws, but for the purpose of preserving and increasing the birds so that there shall be better shooting for everybody on the coast.

A campaign of education is necessary, therefore, and I believe that the bird reservation will do more good in making the people understand, not only the need of bird conservation, but its advantages. The game wardens will be looked upon, not as enemies to be avoided and cheated, but as friends who are working for the people's good. If the matter is well managed, the people will regard their reservations with pride, and public opinion will keep the birds there inviolate. The wasted regions near fishing villages now devoid of all sea-bird life on the one hand and the crowded bird reservations on the other will be powerful object lessons in this process of education. I would suggest the placing of a brief notice on each reservation, printed in English, as well as in French, Montagnais or Eskimo, where these languages are used, worded somewhat as follows:

BIRD RESERVATION

The purpose of this reservation is to preserve the birds from destruction and to increase their numbers, so that there will be better shooting on the coast. The people are asked not to disturb the birds or their eggs on this reservation and to avoid the use of guns in its neighborhood.

There are a number of places that could be named, some of which have responsible men living near, who could be made guardians. For example, on the Canadian Labrador coast I would suggest a small island at the mouth of the bay of Seven Islands, the Perroquet islands off Long point, Mingan, where the lighthouse keeper could be put in charge; Sea Cow island and the small islands in its neighborhood near Eskimo point; an island at Betchewan; one at Piashti bay; one or two at Natashkwan; a strip of the sandy shore near the lighthouse at Natashkwan point; Triple islands, off Romaine; Outer and Gull islands and the cliffs of cape Whittle; Gull island at pointe au Maurier, where the interesting colony of ring-billed gulls breed; St. Mary islands, with its lighthouse; one of the Harrington group of islands; Treble Hill island and Flat island off Great Mekattina; some of the islands of Kecarpoui, near Shekatika and Old Fort, and lastly, and very important, the famous Perroquet island, in Bradore bay. On the Newfoundland Labrador similar scattered reservations should be made.

These scattered reservations are, it seems to me, more important and more easily kept sacred than large ones, such as the 64 miles of coast between cape Whittle and Mekattina, suggested by Col. William Wood in his admirable address in 1911 on "Animal Sanctuaries in Labrador."

Some of these islands are now nearly depopulated of birds, but the birds can be trusted to find out where they are safe. On the coast of the United States, where reservations have been established, sometimes close to great cities, the birds, that are elsewhere very shy and wary, are here tame and confiding. I would also suggest that the guardian of the reservation be instructed in the eider down

industry,* and that a beginning of this industry be made in the reservation, both to eke out the small stipend of the guardian, and as an object lesson to the people.

If the reservation movement is well managed, so that the people are in sympathy with it, it will be a success, and one may look forward to many benefits as a result. First and fundamental, the birds will be saved from extinction. This fact may not appeal to the people, but the improvement in the shooting during the migrations will be welcomed as a great boon. The introduction of the eider-down industry, which, I believe, will follow the reservation movement, should add a large yearly income to the people of the coast. Another desirable result of the reservations will be to make the coast more attractive to tourists in general and to ornithologists in particular, and this class will help the people in several ways. They will necessarily spend money along the coast, will introduce better transportation facilities and new and better ideas of living. To ornithologists everywhere it will be an enormous relief to know that the great destruction of bird life, so vividly portrayed by Audubon, is at last stayed, and the wonderful bird nurseries of the Labrador coast are again assuming their rightful function.

*See paper "*A Plea for the Conservation of the Eider*," by Dr. C. W. Townsend
"*The Auk*," Vol. XXXI, 1914, pp. 14-21.

Appendix V

Orders in Council re Migratory Bird Treaty

[COPY]

P.C. 1247

CERTIFIED COPY OF A REPORT OF THE COMMITTEE
OF THE PRIVY COUNCIL, APPROVED BY HIS ROYAL
HIGHNESS THE GOVERNOR GENERAL ON THE 31st
MAY, 1915

The Committee of the Privy Council have had before them a report from the Secretary of State for External Affairs, dated 6th May, 1915, representing that he has had under consideration a despatch to Your Royal Highness from His Majesty's Ambassador at Washington (No. 36), dated 24th February, 1914, enclosing a draft of a Convention between Great Britain and the United States for the protection of migratory birds in the United States and Canada, put forward by the United States Government.

The Minister observes that it is proposed to accomplish the purpose of the Convention by the establishment of close seasons common to the two countries. The hunting of game birds would be permitted for a period of three and a half months in each year, with the exception of certain species, for which special close periods of ten and of five years, respectively, are provided. The hunting of other birds, to which the Treaty applies, would be entirely prohibited, except for scientific or breeding purposes.

The Minister submits that as the matters dealt with in the proposed Convention are more immediately of provincial concern, he caused the views of the several Provincial Governments to be invited thereon.

Replies have been received from all the Provinces showing that they unanimously approve the principle of the proposed Convention, the majority of them, indeed, having already enacted legislation for the purposes aimed at. British Columbia, however, is unwilling to accept the proposed close season for ducks, geese and other game birds as provided in Article 2, or the provisions of Articles 3 and 4 in so far as they would restrict the killing of cranes, swans, curlews and wood ducks. It is willing that continuous protection should be extended to insectivorous and other migratory non-game birds, and that the shooting of ducks, such as mallards, widgeon, pintails, teal and all other sporting ducks, but not of geese of any kind, should be restricted to the season between September 1st and

February 1st. Nova Scotia desires that the open season for plover and other shore birds should be extended so as to include the latter half of August.

The Minister states that the subject has further been under the consideration of the Departments of the Interior and of Agriculture and also of the Commission of Conservation, and that there is a general concurrence of opinion that the protection of these birds, which is important, especially in the case of insectivorous birds, on economic grounds, and harmonizes with a widely growing sentiment of the desirability of conserving the creations of Nature, should be ensured, and to this end that a Convention for the purpose should be concluded with the United States.

It is not believed that the objections raised by British Columbia and Nova Scotia should present an insuperable difficulty. A fuller explanation of the considerations which influenced the framing of the provisions to which exception is taken might suffice to remove them or further discussion might lead to a compromise.

The Committee concur in the foregoing and, on the recommendation of the Secretary of State for External Affairs, advise that Your Royal Highness may be pleased to request His Majesty's ambassador at Washington to inform the United States Government that the Canadian Government is favourably disposed towards the conclusion of the proposed Treaty and to communicate for their consideration the views herein set forth.

All which is respectfully submitted for approval.

(sgd.) RODOLPHE BOUDREAU

Clerk of the Privy Council

[COPY]

P. C. 1537

CERTIFIED COPY OF A REPORT OF THE COMMITTEE OF
THE PRIVY COUNCIL, APPROVED BY THE DEPUTY
OF HIS ROYAL HIGHNESS THE GOVERNOR GENERAL
ON THE 29TH JUNE, 1916

The Committee of the Privy Council have had before them a report, dated 24th June, 1916, from the Honourable Martin Burrell, for the Secretary of State for External Affairs, to whom was referred a despatch, dated 23rd March, 1916, from His Majesty's Ambassador at Washington, enclosing a revised draft of the proposed Convention with the United States for the protection of migratory birds, which

had been submitted by the United States Secretary of State with an expression of the hope that the signature of Convention might be accelerated.

The Minister states that this revised draft, a copy of which is hereto attached, has been carefully considered by the technical advisers of the Government, and after receiving their report, Your Royal Highness' advisers are of opinion that, subject to certain amendments suggested by them, Canada's consent to the conclusion of the treaty as revised might be given.

The Minister submits that it is understood that as a result of informal negotiations between Dr. C. Gordon Hewitt, the Dominion Entomologist, and Dr. H. W. Henshaw, Chief of the Biological Survey of the United States Department of Agriculture, the United States authorities are prepared to accept these amendments.

The amendments referred to and now proposed by Your Royal Highness' advisers are:

1. That in Article II, section 1 of the Revised draft, in line 7 after the words "and August 15," there shall be inserted the words "and that Indians may take at any time Scoters for food but not for sale."
2. That in Article VII, after the word "agricultural" in line 3, there shall be inserted the words "or other."

The Committee, on the recommendation of the Minister, advise that Your Royal Highness may be pleased to inform Sir Cecil Spring Rice, in reply to his despatch above referred to, that Canada is prepared to agree to the conclusion of the Convention amended in the manner above indicated.

All of which is respectfully submitted for approval.

(Sgd.) RODOLPHE BOUDREAU

Clerk of the Privy Council

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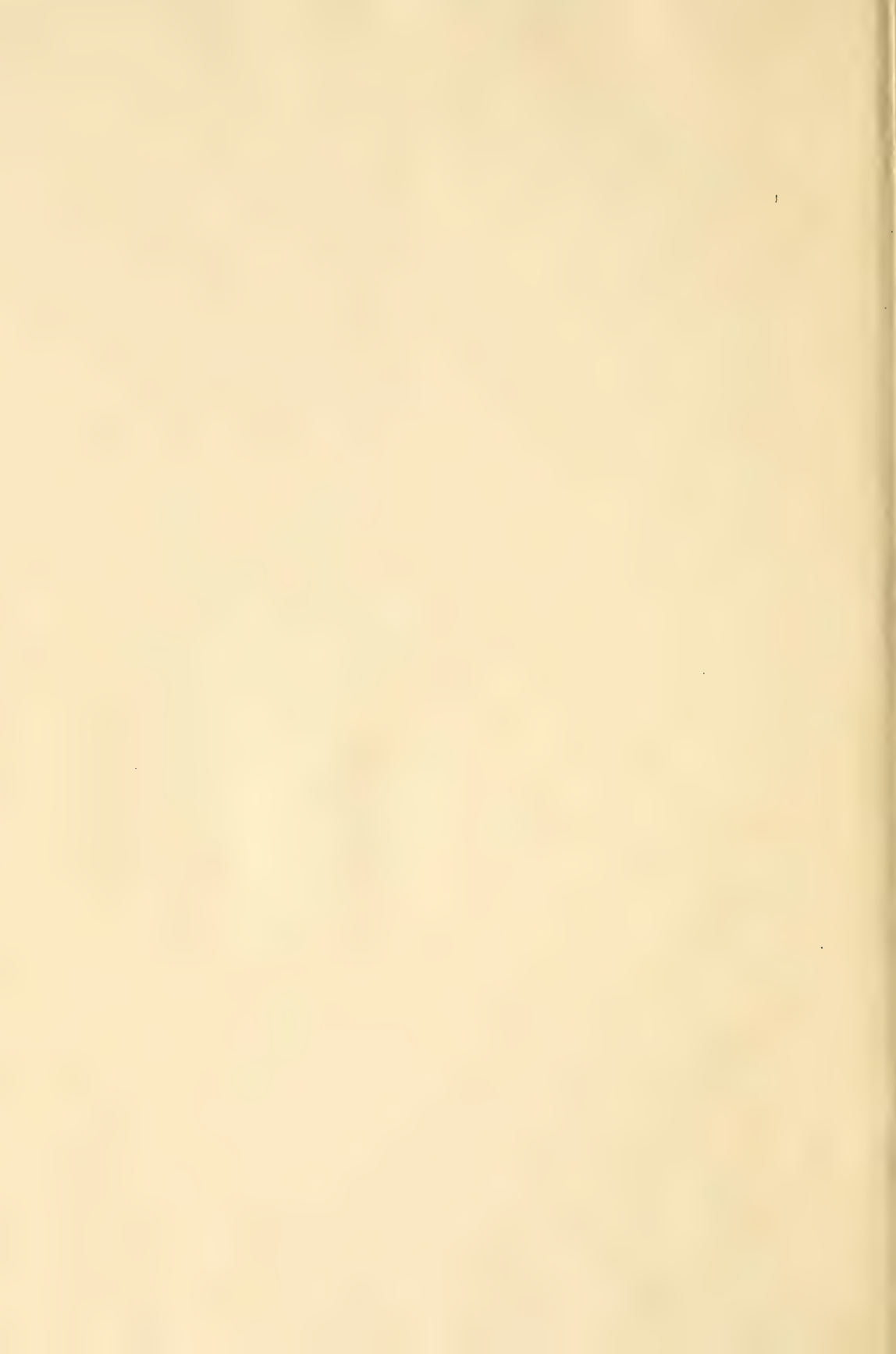
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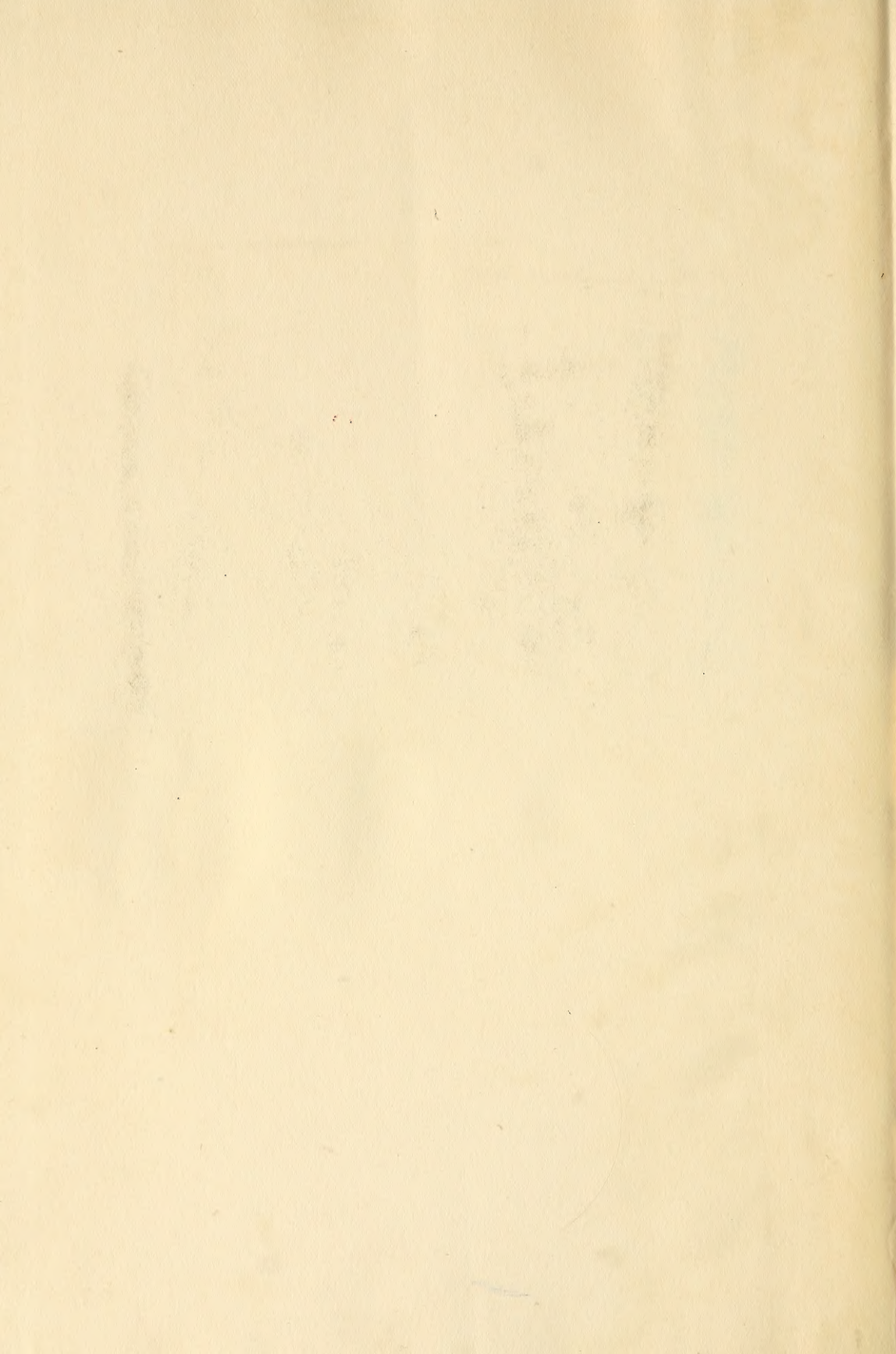
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